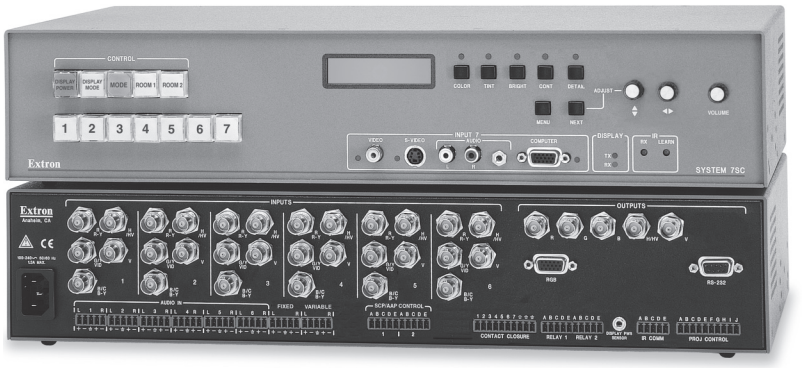
Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual



System 7SC

System Switcher

68-499-01
Printed in the USA

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

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Chapter 1 One

Introduction

About this Manual

About the System 7SC

Features and Options

Introduction

About this Manual

This manual discusses how to install, operate and configure Extron's System 7SC switcher and how to operate the IR 701 infrared remote control that is included with the System 7SC. For information on installing and operating related accessories, see the user's guides for the following products: Extron's Power Sensor (part #68-391-01), IR Broadcaster (part #68-392-02); and the SCP/AAP A, SCP 200, and SCP 250 control pads (part #68-511-01).

Throughout this manual the terms "System 7" and "System 7SC" are used interchangeably to refer to the same product.

About the System 7SC

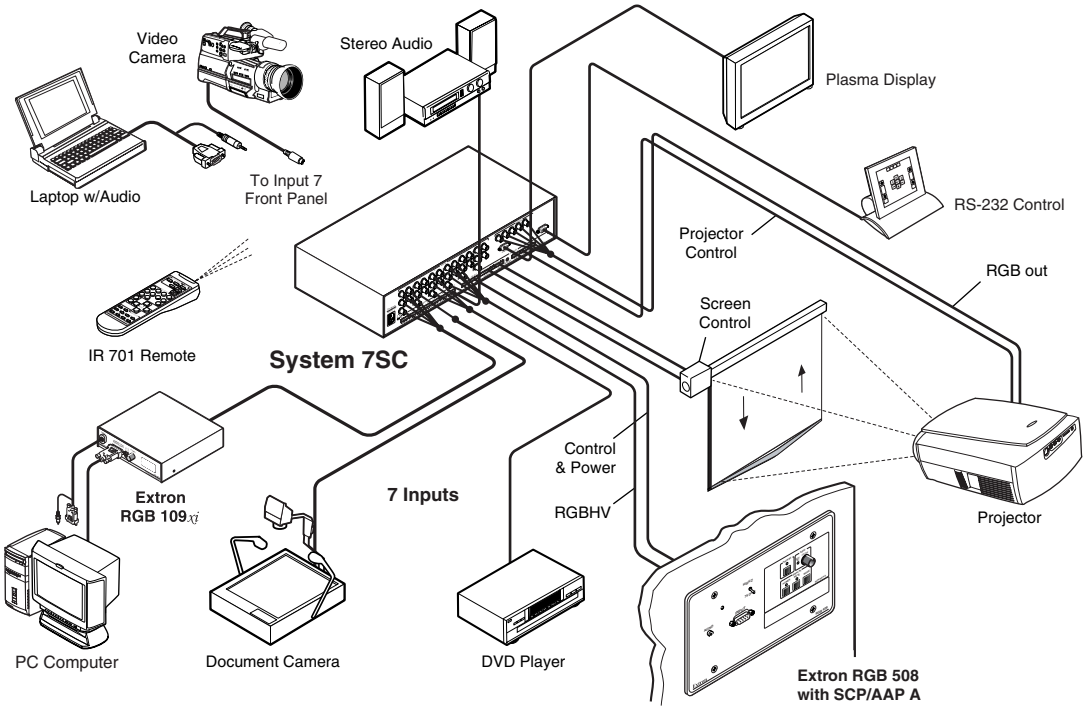
What is the System 7SC?

The System 7SC is a seven input, configurable switcher with a built-in video scaler and projector control ability.

The System 7SC provides central control and integration for small audio/video (A/V) installations. It offers video and audio switching, room controls, and projector control. Each of these functions can be controlled at the front panel, by a hardwired control pad, by infrared remote control (the IR 701), or via RS-232 control.

The switcher can control video and audio input settings; display functions such as power, video mute and video modes; and room functions, such as lowering or raising display screens or powering lights on or off. The System 7SC also has the ability to "learn" infrared projector control commands.

The System 7SC accepts computer-video (RGB), component video, S-video and composite video, and each input is separately configurable. The switcher also accepts seven line-level, balanced or unbalanced stereo audio inputs.



A typical System 7SC application

The System 7SC scales composite video, S-video, and component video up to computer-video (RGBHV/RGBS/RGsB), which can be output to two display devices via individually buffered BNC and 15-pin HD ports. The System 7SC offers one fixed level (preamp) stereo audio output and one variable level stereo audio output.

Rear panel ports allow connection of remote control keypads, the IR Emitter and/or the optional IR Broadcaster, an optional display power sensor, hardwired projector control, and an RS-232 controller. The System 7SC also has a power port to provide power for accessories such as SCP control pads.

Controlling the switcher and an A/V system

The System 7SC can be controlled using one or more of these items:

- The front panel controls.
- A computer, a touch screen panel, or any other device that can send and receive the serial communications through the RS-232 port. Extron's Simple Instruction Set™ (SIS™) is a set of simple keystroke commands that can be used with any such devices, and Extron's control software for Windows provides a graphical interface for controlling the switcher from a computer.
- A contact closure device.
- Extron control pads, such as the SCP 250, SCP 200, or SCP/AAP A.
- The included IR 701 remote control, which can perform all of the front panel functions.

For the System 7SC switcher to control a projector, it must be programmed. The switcher can be programmed by having it learn projector IR commands, or Extron's IR/RS-232 library of commands can be loaded into the switcher's memory. The IR/RS-232 library and the latest control software are available on the Extron Web site at http://www.extron.com.

The System 7SC learns new projector control commands from infrared (IR) signals it receives via its front panel IR port or from commands input via an RS-232 device. These commands are stored in the switcher's memory and assigned to the front panel control (Display Power, Display Mute, Mode, Room 1, Room 2) and input buttons. When a button is pressed, the switcher transmits the stored signals to the projector via the IR comm port or the projector control RS-232 port. The IR 701, optional control pads, and/or an RS-232 control system can also be used to execute these stored commands.

Features and Options

Features

350 MHz (-3dB) video bandwidth

Configurable video inputs —

- **Inputs 1 to 6** — Six sets of 5 BNC connectors on the rear panel accept RGBHV/RGBS/RGsB computer video, component video, S-video or composite video input, and are individually configurable.
- **Input 7** — Input 7 (on the front panel) includes a VGA-type 15-pin HD connector for RGB computer video input, a 4-pin mini DIN connector for S-video input, and one RCA connector for composite video input. Input 7 can be configured for one of these video formats, or it can be set to automatically detect the active input.
  This input is buffered and can drive a signal approximately 50 feet (15 meters) using Extron cable.

Switcher slaving — Input 1 can be used to connect and control a slaved switcher, expanding the capacity of the System 7SC to a maximum of 16 inputs.

Buffered video outputs — Five rear-panel BNC connectors and one VGA-type 15-pin HD port provide connections for RGB output. Both outputs (the BNCs or the 15-pin HD port) are active at all times.

Seven balanced or unbalanced stereo audio inputs — The front panel mini stereo jack or RCA connectors (for unbalanced input only), and six rear panel captive screw connectors accept audio inputs. Each input's gain and attenuation levels can be individually set.

Two balanced or unbalanced stereo audio outputs — One fixed line level output (for a recording device) and one variable line level output (for use with an amplifier or mixer) are provided on 3.5 mm, 5-pole captive screw terminals. The variable line level output can be controlled via the front panel, the IR 701, optional control pads, or an RS-232 system.

Audio breakaway — Audio and video can be switched separately via RS-232.

Four ways to control the switcher — The switcher's front panel, a computer or other RS-232 control device, the included IR 701 remote control, or a remote keypad can all be used to control the switcher.

RS-232 configuration — The System 7SC can be configured by using the Extron control software for Windows, or by using a third party control system.

Room controls — Two relays are provided for controlling lights, window coverings, a display screen or another item in the room. The Room control buttons can be set to also send an IR or RS-232 command.

Projector control — The System 7SC can control the projector's display power, video mute and mode functions.

Projector control command learning — The switcher can "learn" new projector control commands by storing IR signals it receives through the front panel, via files downloaded from Extron's command library, or from commands entered via the Windows-based control program. Learned commands can be associated with any of the front panel input selection or control buttons, and they are output through the IR Emitter/IR Broadcaster or the projector control RS-232 port.

Inactivity projector shutdown timer — Using the included control software, the switcher can be set to monitor the time elapsed since the last input selection (or other function) and to send a command to turn the projector off after a set period of inactivity.

Triple-Action Switching™ — With this method, a blank screen is displayed while the System 7SC switches between inputs.

Built-in video scaler — This feature scales all composite, S-video and component video signals up to computer-video rates for output on RGB display devices.

Accu-RATE Frame Lock™ — The Extron Accu-RATE Frame Lock™ (patent pending) eliminates artifacts from scaled motion video by eliminating frame rate conversion. It locks the output frame rate to the input frame rate of the active input. The result is a switching system that eliminates image tears and other artifacts from motion video.

Dynamic Motion Interpolation™ (DMI™) — This video processing technique is an advanced motion prediction and compensation method that treats motion content and still content with different algorithms to yield high fidelity images.

3:2 pulldown detection for NTSC and 2:2 film detection for PAL video sources — These advanced film mode processing features help maximize image detail and sharpness for video sources that originated from film. When film is converted to NTSC video, the film frame rate has to be matched to the video frame rate in a process called 3:2 pulldown. Jaggies and other image artifacts can result if conventional deinterlacing techniques are used on film-source video. The System 7SC's advanced film mode processing recognizes signals that originated from film. The System 7SC then applies video processing algorithms that optimize the conversion of video that was made with the 3:2 pulldown process. This results in richly detailed images with sharply defined lines. A similar process is used for PAL film-source video.

Versatile mounting options — The System 7SC can be rack mounted, or it can be placed on a table or other furniture. Rubber feet and rack mounting hardware are included.

Options and accessories

The System 7SC's optional equipment expands a user's ability to control system devices. Optional equipment includes:

- **Display power sensor —** This sensor (part #60-271-01) detects whether the projector's power is on or off.
- **SCP control pads —** Up to sixteen (16) Extron SCP/AAP A, SCP 200, and/or SCP 250 control pads can be connected via a rear panel port. Each SCP replicates some or all of the System 7SC's front panel controls.
- **IR Broadcaster —** The Extron IR Broadcaster (part #60-272-02) has a greater range than the IR Emitter and transmits signals over a wide area.

Chapter 2

Installation

Mounting the Switcher

Cabling and Panel Views

Connecting and Slaving a Switcher

Labeling Buttons on the System 7SC and SCPs

Installation

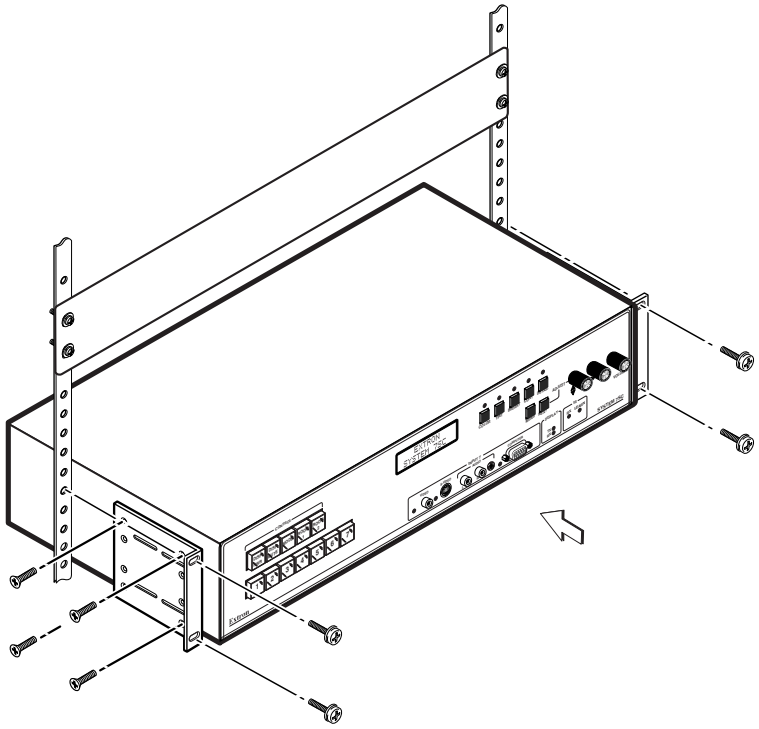
Mounting the Switcher

Tabletop use

The System 7SC comes with rack mounting brackets and rubber feet. For tabletop use, attach a self-adhesive rubber foot to each corner of the bottom of the unit.

Rack mounting

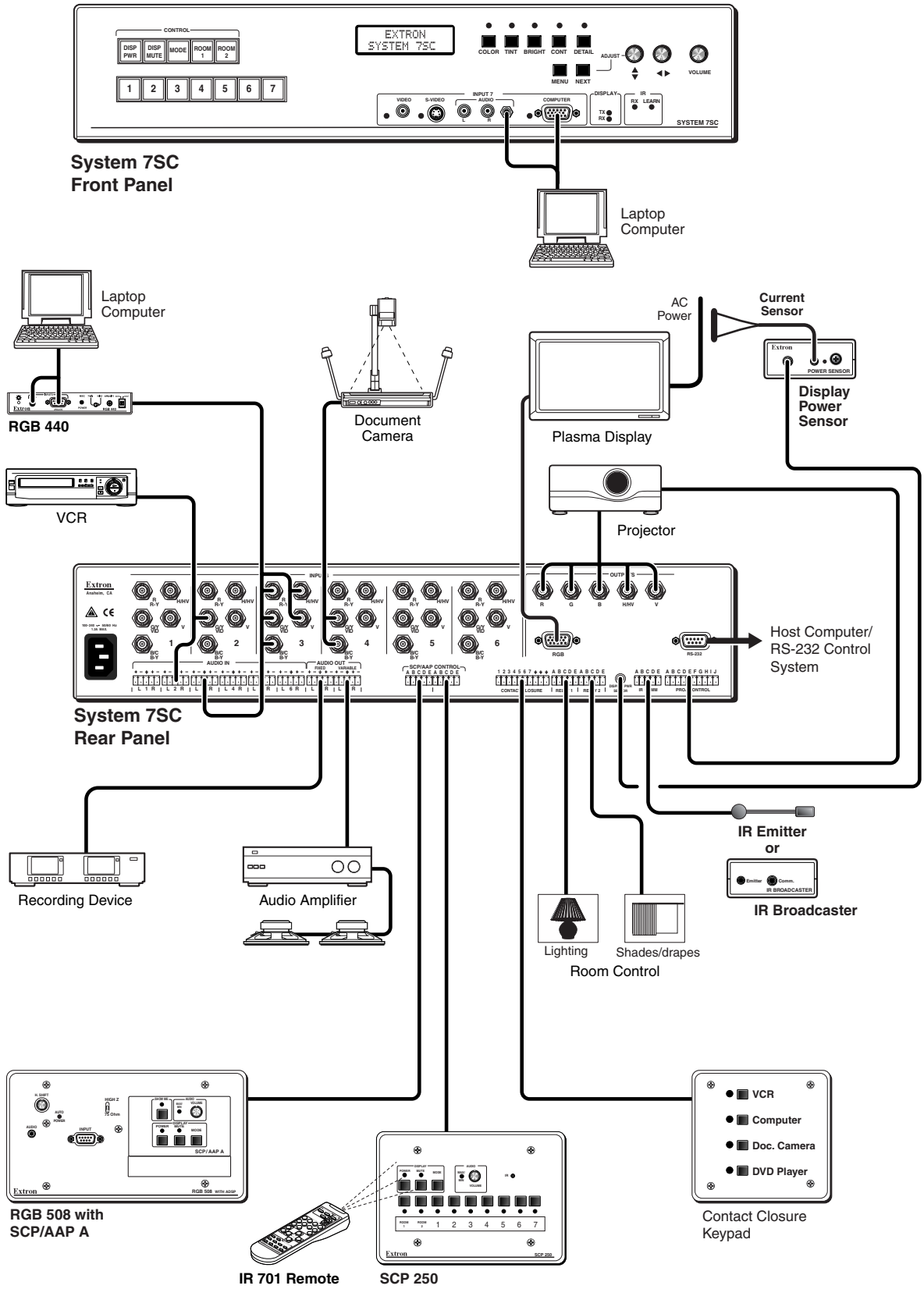
For rack mounting, do not install the rubber feet. Attach the provided rack mounting brackets to the switcher with machine screws, as shown below, then fasten the switcher to the rack using the supplied machine screws.



Rack mounting the System 7SC

Cabling and Panel Views

The diagram on the next page shows an example of a typical System 7SC application and cable connections.


System 7SC
Front Panel
Laptop
Computer
Laptop
Computer
RGB 440
Document
Camera
AC
Power
Current
Sensor
Display
Power
Sensor
Plasma Display
VCR
Projector
System 7SC
Rear Panel
Host Computer/
RS-232 Control
System
IR Emitter
or
IR Broadcaster
Recording Device
Audio Amplifier
Lighting
Shades/drapes
Room Control
RGB 508 with
SCP/AAP A
VCR
Computer
Doc. Camera
DVD Player
Contact Closure
Keypad
IR 701 Remote
SCP 250

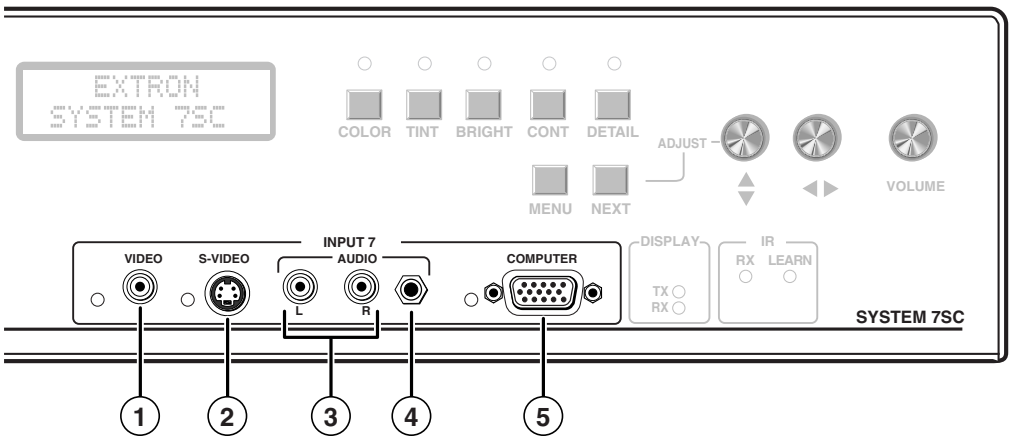
Power, video, and audio conections

With the exception of input 7 on the front panel, all input and output connectors are on the rear panel.

Front panel inputs

Input 7 on the front panel accepts video and *one* audio input. Only one video format and one audio port will be active at a time on the front panel.

The active input type (RGB, S-video, or composite video) can be selected via the LCD menu (see chapter three, "Operation and Configuration", for details), or, in autoselect mode, the System 7 automatically detects the active video signal and selects that video signal format. If all formats are active, the default will be RGB computer video input. An LED near each video connector indicates which input type is active.

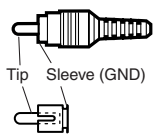


NOTE *If the autoselect feature is on, and input 7 is selected, and all ports for input 7 have active video signals, then the 15-pin HD computer video (RGB) port will be selected as the default source. Both input 7 and the autoselect feature must be selected for autoselect to be active.*

(1) **Composite video (Video) port** — This female RCA-type connector is for composite video input. In autoselect mode, the composite video input will be set for motion mode.

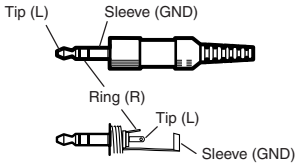
(2) **S-video port** — Connect an S-video source to this 4-pin mini DIN connector. In autoselect mode, S-video will be set for motion mode.

(3) **RCA audio port** — Connect the left audio signal cable to the white RCA connector (L), and the right signal cable to the red RCA connector (R) for unbalanced stereo audio input. Wire the RCA plugs as shown at left.



NOTE *Connect an active audio input to <u>only one</u> audio port – either the RCA port or the PC port.*

(4) **PC audio port** — This 3.5mm mini stereo jack is for unbalanced, computer level stereo audio input. Wire the plug as shown at right.

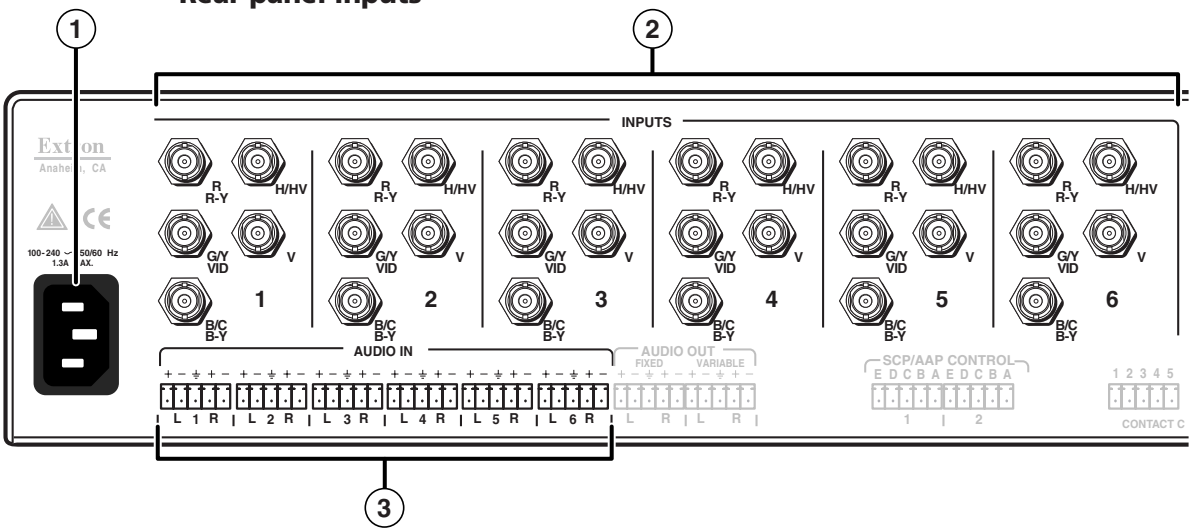


NOTE *Connect an active audio input to <u>only one</u> audio port – either the PC port or the RCA port.*

(5) **Computer video (RGB) port** — Connect a computer video (RGBHV, RGBS, RGsB, or RsGsBs) source via this VGA 15-pin HD connector. By default pins 4, 10, and 11 are grounded for ID bit termination.

NOTE *Input 7 is buffered and can drive a signal approximately 50 feet (15 meters) using Extron cable.*

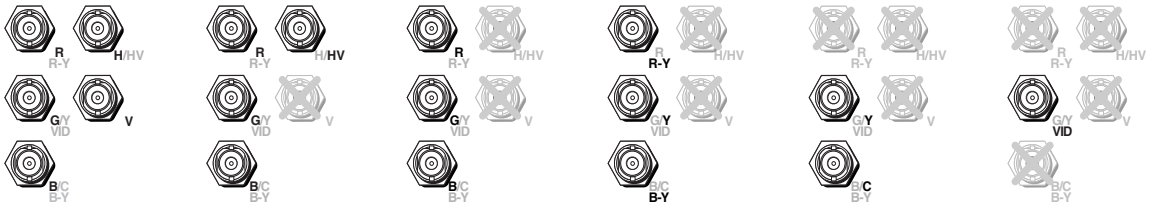
Rear panel inputs



1. **AC power connector** — Plug a standard IEC power cord into this connector to connect the switcher to a 100 to 240VAC, 50 Hz or 60 Hz power source. The front panel control and input selection buttons will light in sequence during power-up.

2. **Video inputs 1 through 6** — These inputs accept computer video (RGB), component video, S-video, or composite video signals. The front panel input selection button lights steadily when the corresponding input is selected. If audio breakaway is active, the front panel input selection button corresponding to the audio input source blinks, and the button corresponding to the video source lights steadily.

   Each input has 5 female BNC connectors. Connect the cables for the appropriate signal type as shown in the following illustration.



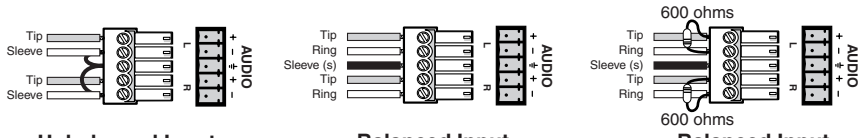
RGBHV input | **RGBS input** | **RGsB input** | **Component video input (R-Y, Y, B-Y)** | **S-video input (Y, C)** | **Composite video input (Video)**

   For S-video, connect the luma (Y) signal to the BNC connector marked G/Y/Vid, and the chroma signal (C) to the BNC marked B/C/B-Y. A BNC-to-4-pin mini DIN (S-video) adapter may be required.

NOTE *Configure each input's video format via the front panel LCD menu (see chapter three, "Operation and Configuration") or using RS-232 programming (see chapter four, "Serial Communication").*

NOTE *If a slave switcher will be used, the output of that switcher must be connected to input 1 of the System 7SC.*

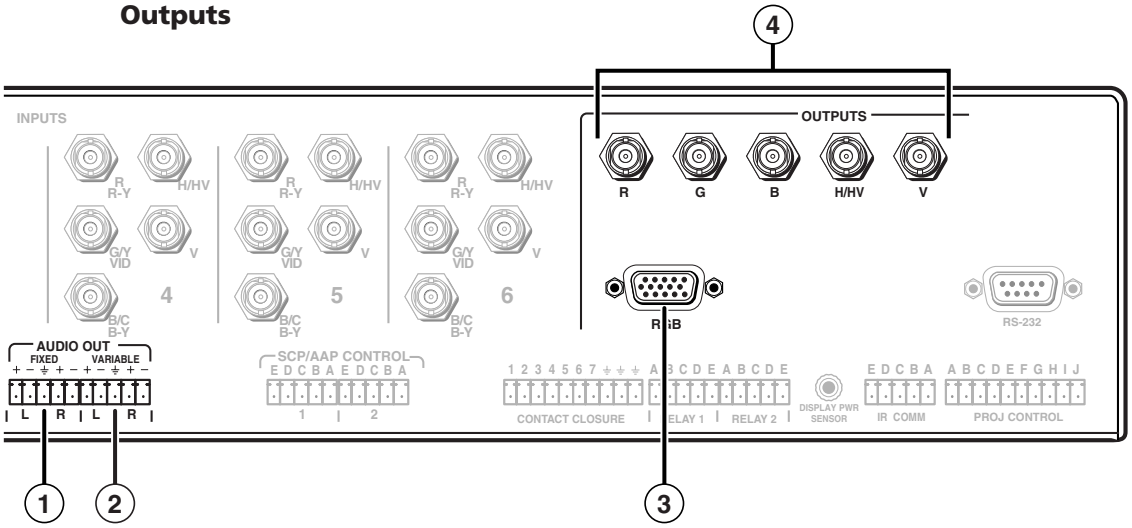
③ **Audio inputs 1 through 6** — Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo audio input. Connectors are included with each System 7, but the user supplies the audio cable. See the following wiring diagrams to wire a connector for the appropriate input type and impedance level. High impedance is generally over 800 ohms.



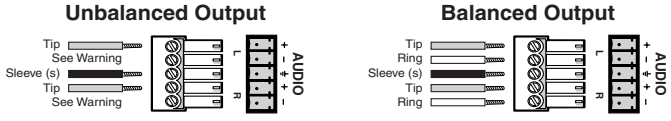
Unbalanced Input (high impedance) | **Balanced Input** (high impedance) | **Balanced Input** (600 ohms)

Captive screw connector wiring for rear panel audio inputs

Outputs



① **Line level audio output (Fixed)** — For unamplified audio output, connect an audio device, such as an audio recorder, VCR, or powered speakers, to this 3.5 mm, 5-pole captive screw connector. Follow the diagram below for correct wiring.



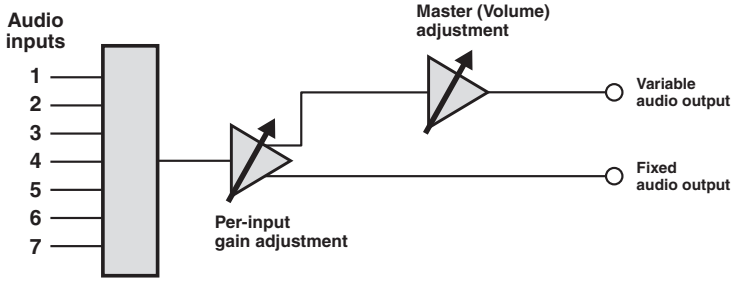
WARNING *Connect the sleeve to ground (Gnd). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

The gain can be set separately for each input channel so that there is no audible difference in level when switching between inputs. See chapter three, "Operation and Configuration", for information on adjusting the audio output level via LCD menu and front panel controls. See chapter four, "Serial Communication", for information on using the Simple Instruction Set (SIS) commands and the Windows-based control program to adjust audio levels and to set audio breakaway.

NOTE *The Fixed audio output and the Variable audio output are simultaneously active, therefore two devices can be connected at the same time. Both outputs carry the same input's audio signal.*

(2) **Adjustable level audio output (Variable)** — For adjustable level audio output, connect an audio device, such as an amplifier, or mixer, to this 3.5 mm, 5-pole captive screw connector. Follow the diagram and warning shown in (1) for correct wiring. See chapters three and four for details on per-channel input gain adjustments and on audio breakaway.

The overall level for this output is controlled by the front panel Volume knob. As shown in the diagram below, the volume adjustment applies an attenuation after the per-input gain adjustments discussed in (1) are applied. For this output the volume level adjustments apply to all the inputs and cannot be set separately per input channel.



NOTE *The Fixed audio output and the Variable audio output are simultaneously active, therefore two devices can be connected at the same time. Both outputs carry the same input's audio signal.*

(3) **Output 15-pin HD connector** — Connect a display device to this female VGA-style connector for RGB output.

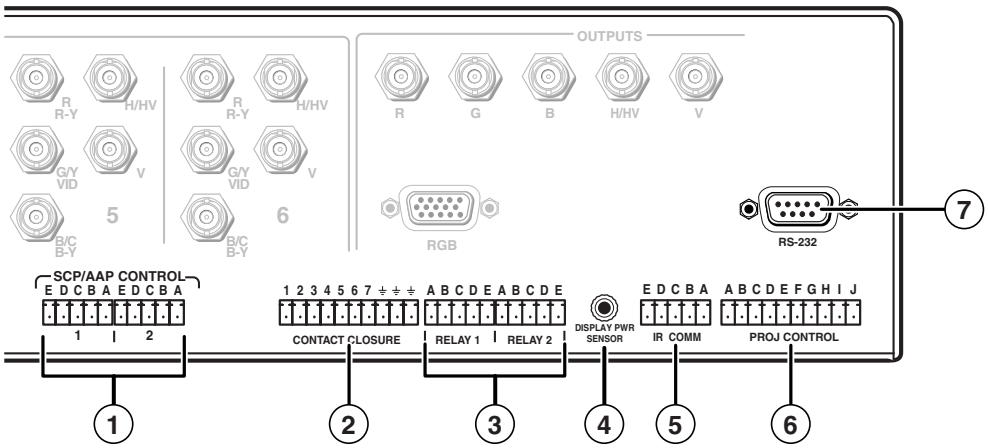
NOTE *Both outputs are buffered and can be connected simultaneously. The sync format will be the same for both outputs.*

(4) **Output BNC connectors** — Connect coaxial cables from another display device to these BNCs for one RGBHV, RGBS, or RGsB/RsGsBs video output as follows:

NOTE *Both outputs are buffered and can be connected simultaneously to two different displays. For RGB inputs, the output signal's sync format is based on the format of the incoming RGB signal. For all other types of inputs, the user selects the output sync format. The sync format will be the same for both outputs.*

Control device connections

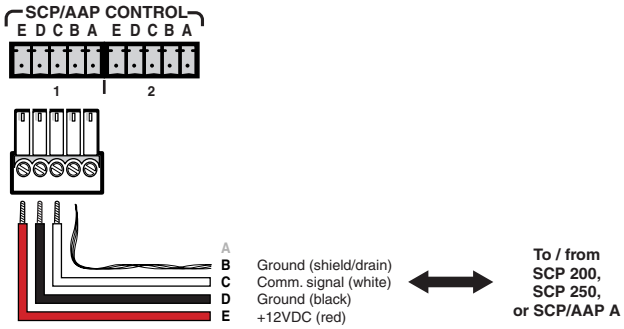
NOTE *Captive screw and 3.5 mm stereo jack connectors are included with the switcher, but the installer provides the cables.*



(1) **SCP/AAP Control ports** — Connect Extron SCP control pads (SCP 250, SCP 200, or SCP/AAP A) to these 5-pole captive screw connectors to provide remote control of the System 7SC. The SCPs replicate several of the front panel controls. The SCP 200 and SCP 250 are also able to receive infrared signals from the IR 701 remote control and send them to the switcher.

In total, up to sixteen (16) control pads in any combination can connected to these ports if they are linked together with cables such as Extron's Comm Link cable. Refer to the appropriate SCP user's manual for details and wiring diagrams.

The SCP/AAP Control port has the following pin assignments:



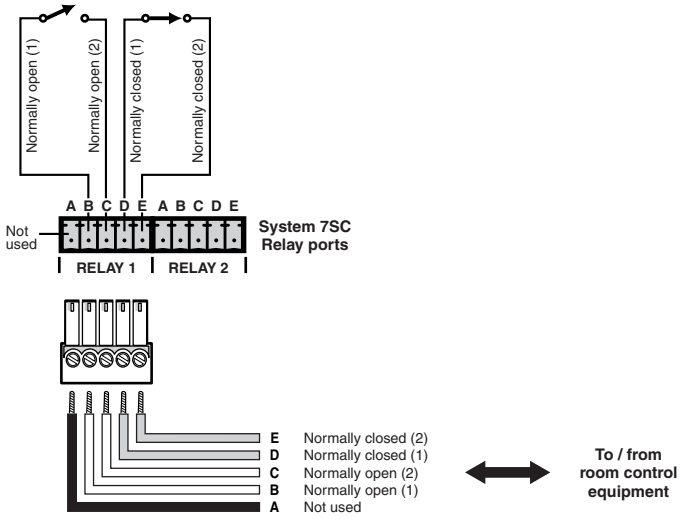
NOTE *Each port provides up to 12VDC for powering the SCP control pads or other devices. However, the total load for both ports combined must not exceed 1 ampere.*

NOTE *The load (such as an SCP control pad or interface) should not be placed further than a maximum of 300 feet (91.4 meters) from the System 7SC switcher.*

(2) **Contact closure** — Connect an optional contact closure control device here. Select an input channel by making contact closure between an input's pin (pins 1 through 7 correspond to inputs 1 through 7) and a ground pin (pins 8, 9, and 10). Continuous connections made by contact closure override all other means of selection: continuous contact closure takes precedence over front panel and RS-232 selection.

③ **Room/relay ports (Relay 1, Relay 2)** — These allow control of "room" functions – items such as room lighting, window coverings, and display screens – via momentary or latching contact. These contacts may be used to control any equipment as long as the contact specifications of a total of 24 volts at 1 ampere are not exceeded for each port.

Each relay has two sets of contacts: one pair is closed by default, the other pair is open by default, as shown below. Both of a relay's contacts can be used at the same time, so a total of four sets of contacts can be used simultaneously.



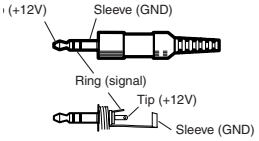
When the room function is active, the closed contacts open, and the open contacts close. Contacts can be programmed to operate in one of two ways:
- latching (brief contact) (press to turn on, press to turn off), or
- momentary (timed) (press to turn on, timeout to turn off).

In the timed mode the default timeout period is 1/8 second. Use the front panel menus or the control software for Windows to change the length of the timeout period. See "Serial Communication", chapter four, for details.

④ **Display power sensor port** — This mini stereo-style jack allows connection of an optional display power (current) sensor (part #60-271-01). The sensor is used to keep the projector and the System 7SC in sync. Refer to the *Power Sensor User's Guide*, part #68-391-01, for information on operating the sensor.

WARNING *The power sensor port supplies +12VDC. To avoid electric shock when connecting the cable from the power sensor into the System 7's rear panel port, always connect the stereo jack at one end of the cable to the power sensor unit before plugging the jack at the other end into the System 7.*

The wiring connections are the same on both ends of the cable that connects the power sensor to the System 7.
Wire the included connector as shown at left.
Use a 3-wire cable.

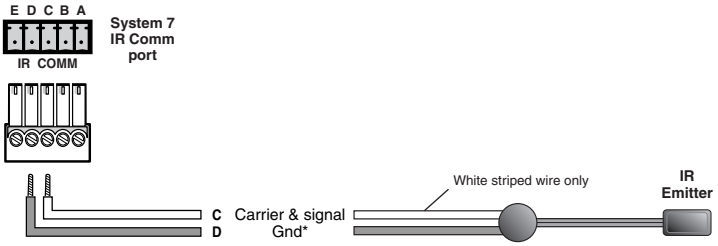


⑤ **IR communications port (IR Comm)** — Connect the included IR Emitter or optional IR Broadcaster via this captive screw connector to send learned/uploaded IR signals (which differ from IR 701 remote control signals) to control the projector. The signals from the optional IR Broadcaster cover a wider area and greater distance than do those from the emitter, so it can be placed further from the projector.

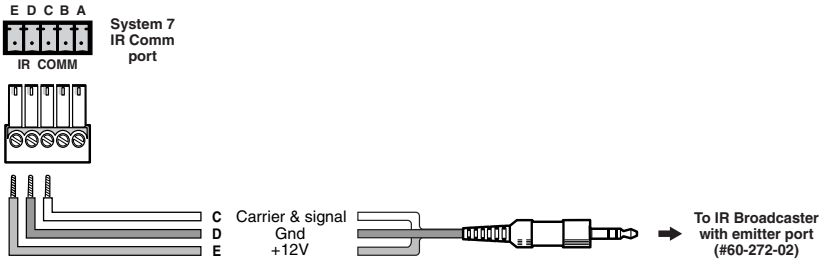
The pin assignments are as follows:

A Signal
B Display power/current sensor detection
C Carrier & signal
D Gnd
E +12V

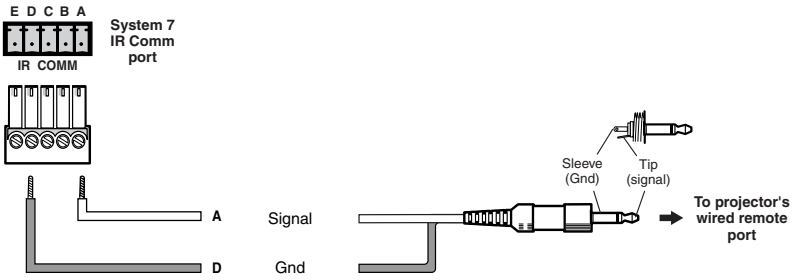
Wire the connector using one of the following wiring options.



For the IR Emitter only



For the IR Broadcaster with emitter port



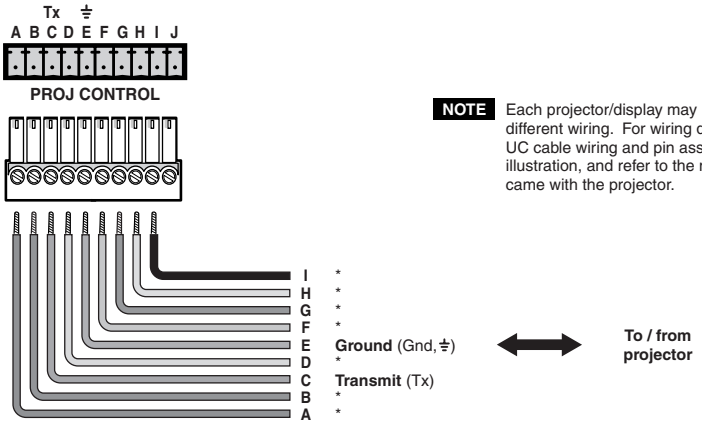
For a wired projector remote port

IR Communications port wiring options

NOTE *For some projectors the emitter must be used together with the IR Broadcaster. Refer to the IR Broadcaster User's Guide (part #68-392-02) or contact an Extron support representative for details.*

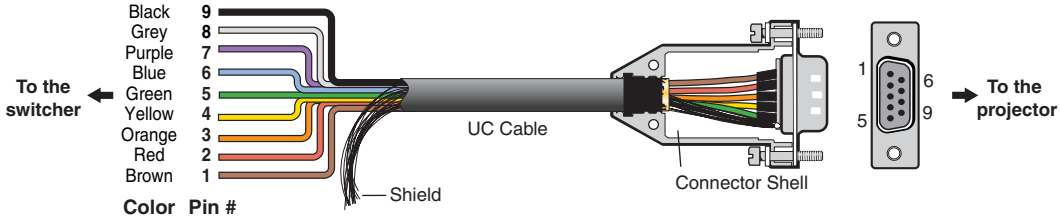
(6) **Projector control port** — Connect a cable between the projector and this 3.5 mm, 10-pole captive screw connector for RS-232 or RS-422 one- or two-way projector/display device control. Commands from a downloaded projector control program or user-defined command strings entered via the Windows-based control program can be sent to the display device from this port.

Use the illustration below as a guide to wiring the connector. Wiring will vary depending on the projector model. In most cases only the transmit (Tx) and ground connections will be needed.



NOTE Each projector/display may require different wiring. For wiring details, see the UC cable wiring and pin assignments illustration, and refer to the manual that came with the projector.

We recommend using the UC 50′ universal projector control cable (included with the System 7SC) for this connection. One end of the cable is terminated with a female 9-pin D connector, and the other end is unterminated. The UC 50′ pin assignments are as shown in the following illustration. Refer to the projector's manual for the projector's pin assignments in order to determine which of the cable's wires to connect to which of the System 7's projector control port pins.



UC 50', 100', 200' Cable Color Codes

Two categories of projector control files are sent via this port: RS1 and RS2. Both types make it possible to control a projector's power, mute, and input selection functions.

RS1 files are for unidirectional (talk only) communication from the switcher to the projector. RS1 requires only wiring the ground pins, the switcher's transmit pin, and the projector's receive pin. Refer to the following table and to the projector's manual for wiring instructions.

RS1 (unidirectional communications) wiring — used with user-defined and RS1 Extron files

Pin	RS-232	RS-422
I	n/a	Transmit - (Tx-)
E	Ground	Ground
C	Transmit (Tx)	Transmit + (Tx+)

NOTE Each projector/display may require different wiring. For details, refer to the manual that came with the projector.

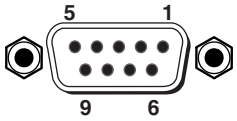
RS2 files are for bidirectional (talk and listen) communications between the switcher and projector. Transmit, ground, *and* receive pins must be wired for RS2 communications. Except for the ground connection, RS2 wiring is projector-specific. Refer to the projector's manual for details or call the Extron S3 Sales and Technical Support Hotline if needed.

⑦ **RS-232 port** — This connector provides for two-way RS-232 communication. See the "Serial Communication" chapter for information on how to install and use the control software and SIS commands.

The default protocol is 9600 baud, 1 stop bit, no parity, and no flow control.

The rear panel RS-232 9-pin D connector has the following pin assignments:

Pin	RS-232 function	Description
1	–	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	Tx 2	Transmit data
5	Gnd	Signal ground
6	–	No connection
7	–	No connection
8	Rx 2	Receive data
9	–	No connection



DB9 Pin Locations
Female

Pins 4 and 8 (Tx2 and Rx2) are used to communicate with a slaved switcher (if one is connected). A slave adapter cable (Extron part #26-386-01) is required for slaving. For details, see "Connecting and Slaving A Switcher" in this chapter, and also see "Switcher Setup/Configuration" in chapter three.

Connecting and Slaving a Switcher

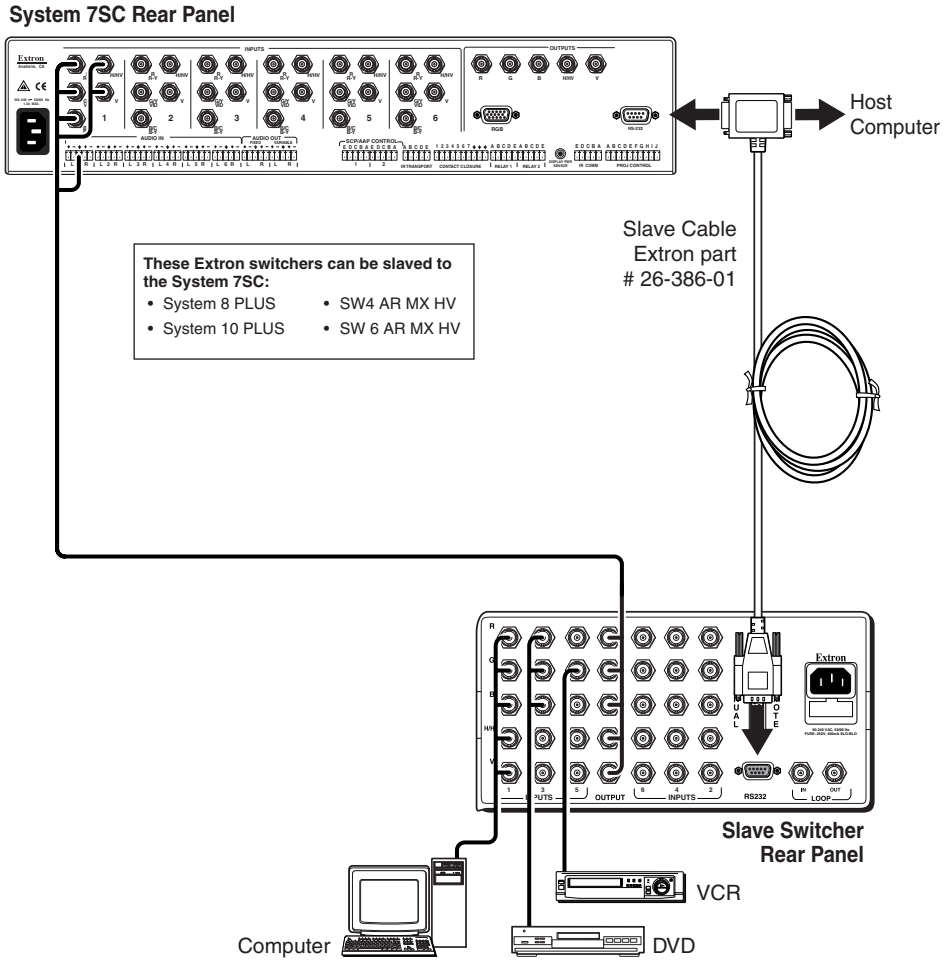
One switcher can be connected (slaved) to the System 7SC to allow for a greater number of inputs. The System 7SC serves as the master switcher, communicating with and providing video output to the projector/display. The switcher ("slave") that is connected to the System 7 provides up to ten (10) additional input connections. See the illustration below for a list of Extron switchers that can be used as slaves.

NOTE *A System 7SC cannot be used as a slaved switcher.*

NOTE *The RS-232 and video cable connections must be made between the slaved switcher and the System 7 before the System 7 can be configured (via front panel or RS-232) for slaving.*
Do not attach any communications or control devices to the slaved switcher except a contact closure remote control, if one is needed.

To connect a slave switcher to the System 7SC, do the following:

1. Connect the slave switcher's video and audio outputs to input 1 of the System 7SC. See "Rear panel inputs", page 2-5, in this manual, and refer to the slave switcher's user's manual for details on cabling.


System 7SC Rear Panel
Host Computer
Slave Cable Extron part # 26-386-01
These Extron switchers can be slaved to the System 7SC:
• System 8 PLUS
• System 10 PLUS
• SW4 AR MX HV
• SW 6 AR MX HV
Slave Switcher Rear Panel
VCR
Computer
DVD

The System 7SC master connected to a slaved switcher

2. Connect the RS-232 ports of the two switchers. A slave adapter cable (Extron part number 26-386-01), is required for RS-232 connection. This allows the master (System 7), the slaved switcher, and the host device to be connected simultaneously. The RS-232 communication is bidirectional.

The pin assignments for each of the slave cable's three 9-pin connectors are as follows:

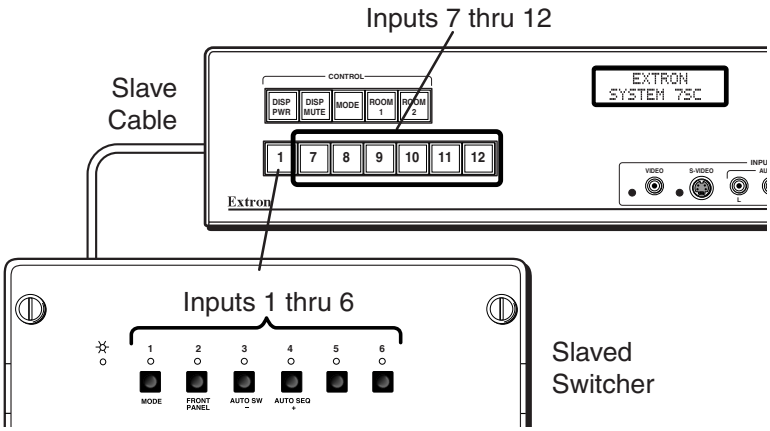
Pin	System 7	Host	Slave switcher
1	–	–	–
2	Tx	Rx	Tx 2 (slave to host)
3	Rx	Tx	Rx 2 (host to slave)
4	Tx 2	*Tx 2	–
5	Gnd	Gnd	Gnd
6	–	–	–
7	–	–	–
8	Rx 2	*Rx 2	–
9	–	–	–

* Pins 4 and 8 on the host connector must be used for Tx2 and Rx2 only, and not for other signals in the host system. If needed, disable or disconnect pins 4 and 8 on the host side.

3. For a System 8 PLUS or System 10 Plus switcher, set the slaved switcher to master mode. On the slaved System 8 PLUS or System 10 Plus switcher, locate the Address DIP switches on the back panel, and set switches #1, 2, 3, 4, and 5 up.
4. Power on the slaved switcher and the System 7SC.
5. From within Add Slave? in the System 7SC's Switcher Setup/Configuration menu, select the slave switcher type and size. See chapter three, "Operation and Configuration", for information on using the menus.
6. Use the front panel buttons and menus or the host computer to configure the video formats for the slaved switcher's inputs. See chapter 3, "Operation and Configuration", for details on how to configure inputs. The inputs of the slaved switcher do not have to all be the same video signal type. Each input can be configured in the System 7 for a different signal type (RGB, component video, S-video, composite video), as long as the slaved switcher can handle those signals. As for the System 7SC's direct inputs, IR and RS-232 commands can also be associated with the slaved inputs.

Once the slaved switcher is connected and configured, its inputs will be the System 7's first inputs (input 1 through input 2, 4, 6, 8, or 10). Input 2 of the System 7 becomes the next input (input 2, 5, 7, 9, or 11).

For example, if a six-input switcher is slaved to the System 7, the slaved switcher's six inputs are inputs numbers 1, 2, 3, 4, 5, and 6. The inputs labeled as 2 through 6 on the System 7's rear panel and 7 on the front panel become inputs 7 through 12, as shown in the illustration on the next page.



Example of input numbering with a six-input slaved switcher

To select an input from the slaved switcher, press the appropriate button on the slaved switcher, or use the RS-232 controller or host computer. Pressing the input 1 button on the front panel of the System 7 selects input 1 of the slaved switcher.

Labeling Buttons on the System 7SC and SCPs

You may wish to customize the labeling of the System 7SC's front panel buttons or to make labels for any SCP 200 or SCP 250 control pads that are part of the installation. Premade templates and blank templates for the SCP faceplates' label windows are printed in the *SCP/AAP A, SCP 200, SCP 250 User's Manual*. However, you can easily create, customize, and print labels for the switcher's buttons or the SCPs' button label windows by using the Button-Label Generator software.

Button-Label Generator software

The Extron Button-Label Generator program (Buttons.exe) is included with the System 7SC, and it can also be downloaded from the Extron Web site (http://www.extron.com). This program is used to create and print labels that can be inserted into the illuminated pushbuttons or placed in slots above/below buttons on the SCPs and on various Extron switchers.

Installing the software

This program is installed at the same time the System 7SC control program is installed. No additional steps are required. See page 4-11 of this manual for installation instructions.

Using the software

1. To run the Button-Label Generator program, double-click on the Button-Label Generator icon (shown at left) in the Extron Electronics group or folder, and click OK when prompted.

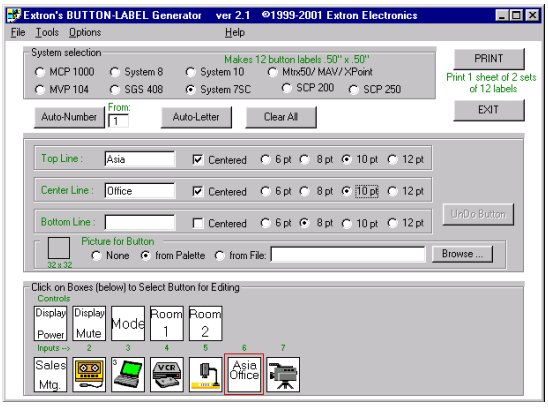
2. Under *System selection*, choose the item that corresponds to the device for which you want to make labels: System 7SC, SCP 200, or SCP 250. The button label editing area changes to reflect the number and arrangement of buttons on the device.

3. Using normal Windows controls, you can create and print labels that can be cut out and placed in the label windows on the front panel of the switcher.

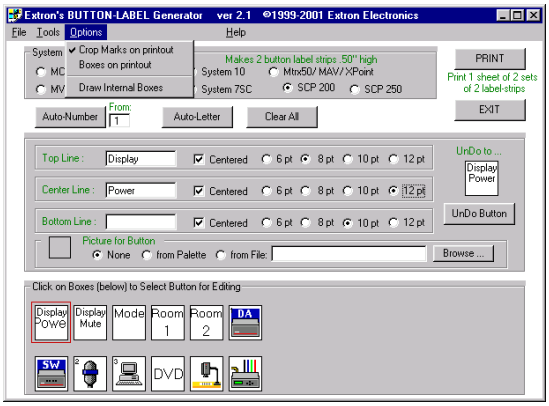
For information about using the program, you can access a help file by clicking on the Help menu on the main screen and choosing *Show Help*.

You can also see an example of a completed Extron's Button-Label Generator window by clicking on the Help menu on the main screen, choosing *Show Help*, and clicking on the Load Demo button.

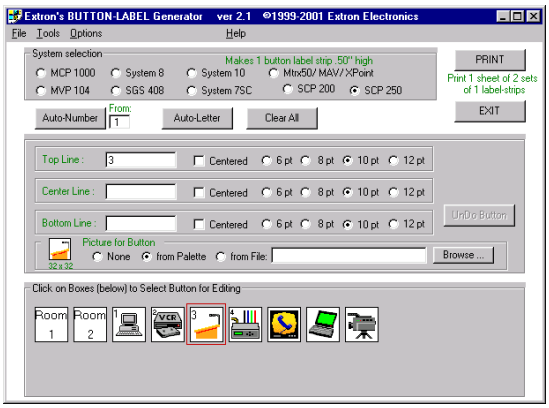
The following pictures are examples of what the Button-Label Generator screens look like when set for the System 7SC, the SCP 200, and SCP 300.



System 7SC button label screen



SCP 200 button label screen


Extron's BUTTON-LABEL Generator ver 2.1 ©1999-2001 Extron Electronics
File Tools Options Help
System selection
Makes 1 button label strip .50" high
MCP 1000 System 8 System 10 Mtrx50/ MAV/ XPoint
MVP 104 SGS 408 System 7SC SCP 200 SCP 250
PRINT
Print 1 sheet of 2 sets of 1 label-strips
EXIT
Auto-Number From: 1
Auto-Letter
Clear All
Top Line : 3
Center Line :
Bottom Line :
Centered 6 pt 8 pt 10 pt 12 pt
Undo Button
Picture for Button
None from Palette from File:
Browse ...
Click on Boxes (below) to Select Button for Editing
Room 1
Room 2

SCP 250 button label screen

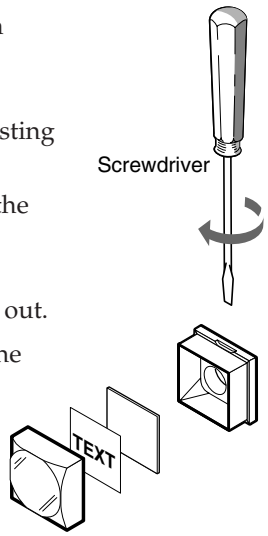
Each button label can contain from 1 to 3 lines of text (or none) with choices for each line of different font sizes and whether to center or left justify the text.

Each button label can also contain a picture (or none) selected either from the Device Palette or a user-supplied graphic file. User-supplied graphics should be icon (.ICO) or bitmap (.BMP) files. Files called TEST.BMP and DEMO_BTN.DAT are installed with this program as examples, and a help file is also included.

Installing labels in the System 7SC's buttons

Label installation for the SCPs is covered in the *SCP/AAP A, SCP 200, SCP 250 User's Manual*. Use the following procedure to install new labels in the System 7SC's front panel buttons.

1. Remove the button from the switcher: grasp the button firmly and pull it away from the front panel.
2. Separate the grey backing from the clear plastic cap by inserting a flat blade screwdriver into the slots and twisting it, as shown at right.
3. Save the translucent, white backing plate, but remove the text insert.
4. Make new labels by using the Button-Label Generator software (see pages 2-14 and 2-15). Print and cut them out.
5. Insert a button label and the white backing plate into the cap and reassemble the button. Press the cap onto the grey backing gently but firmly.
6. Press the button into place in the switcher.



3

Chapter Three

Operation and Configuration

Front Panel Features and Basic Operation

IR and RS-232 Projector Control

Optimizing the System

Menus, Configuration, and Adjustments

Remote Control of the System 7SC

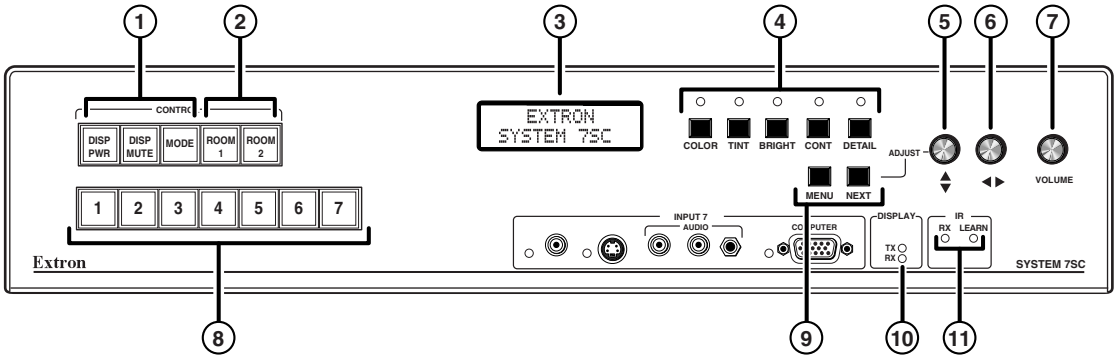
Operation and Configuration

System 7SC can be set up and operated by using:

- The front panel controls.
- A computer, a touch screen panel, or any other device that can send and receive the serial communications through the RS-232 port. Extron's Simple Instruction Set™ (SIS™) is a set of simple keystroke commands that can be used with any such devices, and Extron's control software for Windows provides a graphical interface for controlling the switcher from a computer.
- A contact closure device.
- Extron control pads, such as the SCP 250, SCP 200, or SCP/AAP A.
- The included IR 701 remote control, which can perform the front panel functions.

Some settings can be adjusted only through a host computer. For details on serial communications control via the RS-232 port, see chapter 4, "Serial Communication".

Front Panel Features and Basic Operation



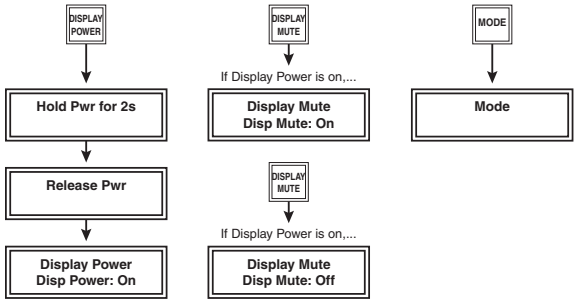
NOTE *When the System 7 powers up, all of the front panel LEDs light while the control buttons and then the input selection buttons light briefly in sequence, then the LEDs turn off.*

NOTE *Each of the front panel buttons can have an RS-232 command and/or an IR command associated with it. If the button is set up via the Windows-based control program, pressing an input selection button could select that input and have the System 7 send an RS-232 command and/or an IR command.*

Control features

(1) **Display buttons: Display Power, Display Mute, Mode** — Each of these three buttons can be configured/programmed to perform or send either an infrared (IR) command or an RS-232 command. Display Power and Display Mute each have two memory blocks that can store 256 bytes of information apiece.

The settings of the display buttons are customized for each projector. These buttons function only after they have been programmed, either by "learning" IR commands or by loading projector commands (drivers) from the Extron IR library. When a display button is pressed or activated by RS-232, one of the following messages is displayed on the LCD screen:



Display Power button

To send a power-on command, press and hold the Display Power button for two seconds. At the end of two seconds, the button will flash twice, then glow steadily while the display device is on.

NOTE *If AC power is removed from the switcher while Display Power is on, the switcher will send an RS-232 power-off command to the display device before shutting down. The System 7 cannot send a power-off command via IR after power has been disconnected.*

To turn the display device off, again press and hold the Display Power button for two seconds. The System 7 will send the power-off command, and the Display Power button will flash twice, then turn off (go dark). Many projectors require a power-off delay. The System 7 has a brief power-off delay, during which the power-off command is resent to the display device.

To shut down the projector if the switcher hasn't been used for a set amount of time, a built-in inactivity shutdown timer can be set by using the included control software. If the inactivity timer is enabled, the switcher monitors the time elapsed since the last input selection (or other function) and sends a display power off command (or that command and any other commands associated with the Display Power button) after a set period of inactivity. That period can be selected in fifteen-minute increments to be as long as 480 minutes (8 hours). See chapter four, "Serial Communication", for details.

The Display Power button can also have the functions of one of the Room buttons assigned to it. The associated room function (relay activation + associated commands) can be executed immediately after the Display Power IR and/or RS-232 commands are sent. The Room button will light when the room function is executed.

Display Mute button

Once it has been programmed for use with the projector, press and release this button to send a mute on/off command to the display device. The button will not flash before sending the command.

NOTE *Display Mute is only active when Display Power is on.*

Mode button

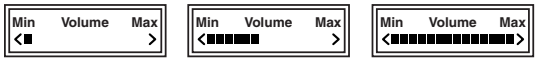
Press this button to execute any IR or RS-232 command that has been programmed into its memory. For example, it can be used to switch the mode of the projector between computer video (RGB), S-video, and composite video, replicating the 1-button (step) mode function provided on some projectors' remote controls.

Each of the Display buttons can be set up to send an IR signal immediately after sending an RS-232 signal once the button is pressed.

(2) **Room buttons** — Room 1 and Room 2 control the rear panel Relay ports, which control "room" functions–items such as room lighting, window coverings, and display screens–via momentary or latching contact. These contacts may be used to control any equipment as long as the contact specifications of a total of 24 volts at 1 ampere are not exceeded. The Room buttons light while the room functions are active (on). Each Room button can also be set to send an IR or RS-232 command when the button is pressed. If the Display Power button has a Room function assigned to it, the Room button will light when Display Power has been pressed, and the room function will be executed.

See page 2-9 for information on the Relay ports, and see chapter 4, "Serial Communication", and refer to the Windows-based System 7SC Help program for details on changing settings.

(7) **Volume control knob**— Turn this knob to adjust the audio volume (gain) for the Variable (preamp) audio output. There is no physical limit to this knob's rotation. During volume adjustment the LCD screen displays a bar graph (shown below), which also indicates when the knob has reached its functional minimum or maximum limit. The minimum setting produces 100% signal attenuation.



In normal mode (not setup mode) the volume control does not affect the Fixed audio output, only the Variable audio output. See pages 2-6 and 2-7 for details on the two audio outputs.

Adjustment features

NOTE *The settings of each type of adjustment (image, centering, zoom, and volume adjustments) are stored in separate memories for each input.*

NOTE *Executive mode locks all front panel functions except input selection and control commands (display and room functions) and disables setup menu options. The System 7SC's front panel and the IR 701 are both affected by executive mode; adjustment features will not be accessible from the front panel and the IR 701 when executive mode is active. However, all functions and adjustments can still be made through RS-232 control. For details on RS-232 control, see chapter four.*

(4) **Image adjustment buttons: Color, Tint, Bright (brightness), Cont (contrast), and Detail** — Use these buttons to adjust the output image. When one of these buttons is pressed, the corresponding image adjustment menu appears on the LCD screen. Adjustments can then be made by rotating the Adjust (▲▼) knob. The LED above each button lights when the feature is being adjusted. Settings and adjustments are stored in nonvolatile memory.

(5) **Adjust/vertical shift (▲▼) knob** — In configuration mode use this knob to scroll through menu options and make adjustments. In regular mode rotate this knob to adjust the vertical shift (centering) of the displayed image.

(6) **Horizontal shift (◄►) knob** — In configuration mode use this knob to scroll through menu options and make adjustments. In regular mode rotate this knob to adjust the horizontal shift (centering) of the displayed image.

(9) **Menu and Next buttons** — Use these buttons to enter and move through menus in the System 7SC. See the "Menus, Configuration, and Adjustments" section in this chapter for details.

Input selection features

(8) **Input selection buttons** — These buttons correspond to the seven inputs. When you select an input, the corresponding button lights and remains lit until another input is selected or power is removed. The factory default (and reset default) is for input one to be active. However, the last input selected before power down will be active when the switcher is powered up.

All inputs accept RGB computer video, S-video, or composite video. Inputs one through six also accept component video (YUV). When an input button is pressed, the LCD displays the input number and video format, as shown below.

If the audio is "broken away" from (switched independently of) the video, the input selection button corresponding to the selected audio input flashes, and the input button corresponding to the video input lights steadily. Audio breakaway can be set up only via RS-232 control. Audio-only and video-only modes are available via RS-232 , but if both audio and video are set to input 0, no audio or video will be output, and none of the input selection buttons will light.

Each of the input selection buttons can also be configured to perform either an IR command, an RS-232 command, or both, just like the Display buttons. Each input button has a memory block of 256 bytes available for storing a command. For details, see the section on projector control in this chapter.

Miscellaneous features

(3) **LCD screen** — This backlit liquid crystal display indicates the status of the switcher and displays information and menus during setup and adjustment. See "Menus, Configuration, and Adjustments" in this chapter for details.

(10) **Display command indicator LEDs**

Transmit (Tx) LED (green) — This LED blinks twice in one second when the System 7SC transmits an infrared or RS-232 command to the projector.

Receive (Rx) LED (amber) — This LED blinks twice in one second when the System 7SC receives an RS-232 confirmation signal from the projector.

NOTE *If the Rx LED blinks instead of the Tx LED during command transmission, there is an internal error. Call the Extron S3 Sales and Technical Support Hotline.*

(11) **IR signal pickup devices** — These allow for IR control of the System 7SC and for IR learning. The IR remote must be pointed directly at these devices for best results.

Receive (Rx) — The IR receiver here receives signals from the IR 701 for controlling the System 7SC switcher.

NOTE *Configuration must be done using the front panel controls or RS-232 control. Configuration cannot be done from the IR 701.*

Learn — This contains the IR learning device. The System 7SC can "learn" commands in order to control the projector. IR learning is only necessary if there is no IR driver file available for that projector or if the driver is not complete. The IR learning procedure is discussed in "Menus, Configuration, and Adjustments" in this chapter.

IR and RS-232 Projector Control

The System 7SC switcher can control a projector or other display device by using IR control signals or RS-232 control (one-way or two-way control). The switcher must be configured for projector control in one of the following ways before it will send commands to the projector:

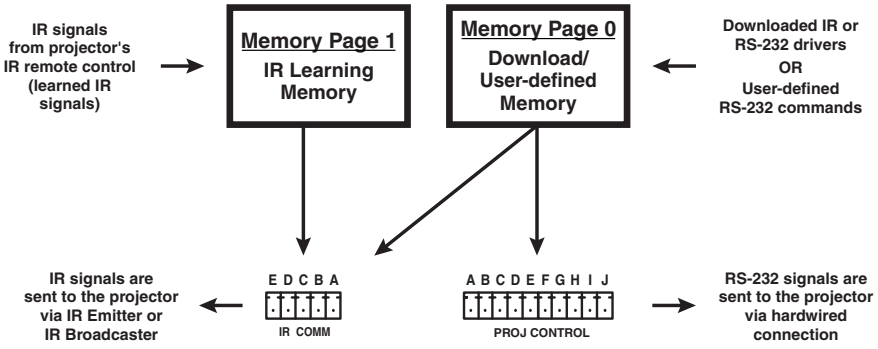
- An IR or an RS-232 driver file can be downloaded from a disk or the Extron Web site into the switcher.
- RS-232 command strings can be entered directly from a host computer using the supplied Windows-based control software.
- IR commands can be entered directly from an IR remote control into the System 7 through IR learning.

Projector control memory

There are two sets of memory for projector control commands:

Memory page 1: IR learning memory — This stores any IR commands that have been "learned" by the switcher. The System 7SC can "learn" projector control commands from a projector's IR remote control. The IR learning procedure is discussed in "Menus, Configuration, and Adjustments" in this chapter.

Memory page 0: download/user-defined memory — This stores all downloaded IR and RS-232 projector driver files, and also any user-defined RS-232 command strings.


IR signals from projector's IR remote control (learned IR signals)
Memory Page 1
IR Learning Memory
Memory Page 0
Download/ User-defined Memory
Downloaded IR or RS-232 drivers OR User-defined RS-232 commands
IR signals are sent to the projector via IR Emitter or IR Broadcaster
E D C B A
IR COMM
A B C D E F G H I J
PROJ CONTROL
RS-232 signals are sent to the projector via hardwired connection

Projector control memory usage

Each time a new projector driver is downloaded into the System 7's download/ user-defined memory, all previously downloaded drivers (IR or RS-232) and user-defined RS-232 commands will be replaced (overwritten or deleted) by the new driver. Similarly, entering user-defined RS-232 projector commands will also cause all previously downloaded drivers and user-defined commands to be replaced.

NOTE *Entering or editing an RS-232 command will change the "owner" status. See chapter four, "Serial Communication" for details.*

Learned IR commands will not be affected when a new driver or command string is downloaded. Because learned IR commands are stored in a different memory location, learned IR commands can be executed at the same time as RS-232 commands.

Example
A projector can be hardwired to the System 7's 10-pole projector control port for RS-232 communication, and an IR Emitter or IR Broadcaster can be connected to the 5-pole IR Comm port. If the System 7 "learns" IR commands for a plasma display, and an RS-232 projector driver is also downloaded to the switcher, the System 7 can control both display devices simultaneously. If an Extron IR projector driver is then downloaded to the System 7, the RS-232 commands are replaced by the new driver,

and both the learned and downloaded IR commands will be sent out the IR Comm port to the IR Emitter or IR Broadcaster.

Optimizing the System

For optimal performance, follow the steps in this section in order when setting up the System 7SC and its input and output devices.

Setting up a DVD source

To get the best results when using a DVD as a video source, Extron recommends that the DVD player itself be setup to output an aspect ratio of 16:9 and not 4:3. Because all DVDs are mastered as 16:9, having them set up for anything else will cause the player to internally scale and compress the signal. This scaling/ compression by the DVD player will defeat the advantage of having 3-2 pulldown detection in the System 7SC.

To change the output aspect ratio of most DVD players,

1. Enter the DVD player's Setup or Action menu while the disc is stopped.
2. Select a 16:9 aspect ratio.

Menus, Configuration, and Adjustments

Switcher/scaler configuration and adjustments can be performed by using the Windows-based control program (see chapter 4 for details) or by using the front panel controls and the menus that are displayed on the System 7's LCD screen. These menus are used primarily when the switcher is first set up.

Moving through menus by using front panel controls

Menu button — Press the Menu button to activate menus and to scroll to the five main menus.

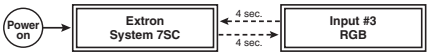
Next button — Press the Next button to move between the submenus of a selected main menu. Pressing the Next button during input configuration causes the current input's number and format type to be displayed on the LCD

Adjust/shift (▲▼, ◄►) knobs — In configuration mode rotate one of these knobs to scroll through submenu options and to make selections and adjustments. In this chapter the vertical shift knob (▲▼) will be shown as the Adjust knob.

Image adjustment buttons: Color, Tint, Bright (brightness), Cont (contrast), and Detail — When one of these buttons is pressed, the corresponding image adjustment menu appears on the LCD screen. Adjustments can then be made by rotating the Adjust (▲▼) knob. The LED above each button lights when the feature is being adjusted. Settings and adjustments are stored in nonvolatile memory.

Menu overview

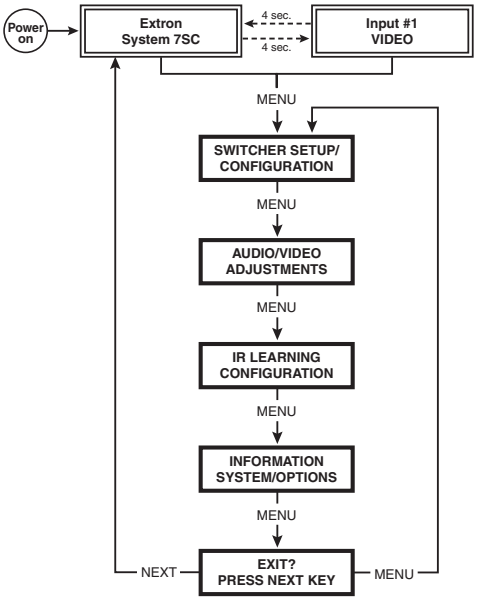
The default menus appear on the LCD when no adjustments are actively being made. They cycle between the screen showing the name of the switcher and the screen that shows the active input's number and video format, as shown below.



Default menus

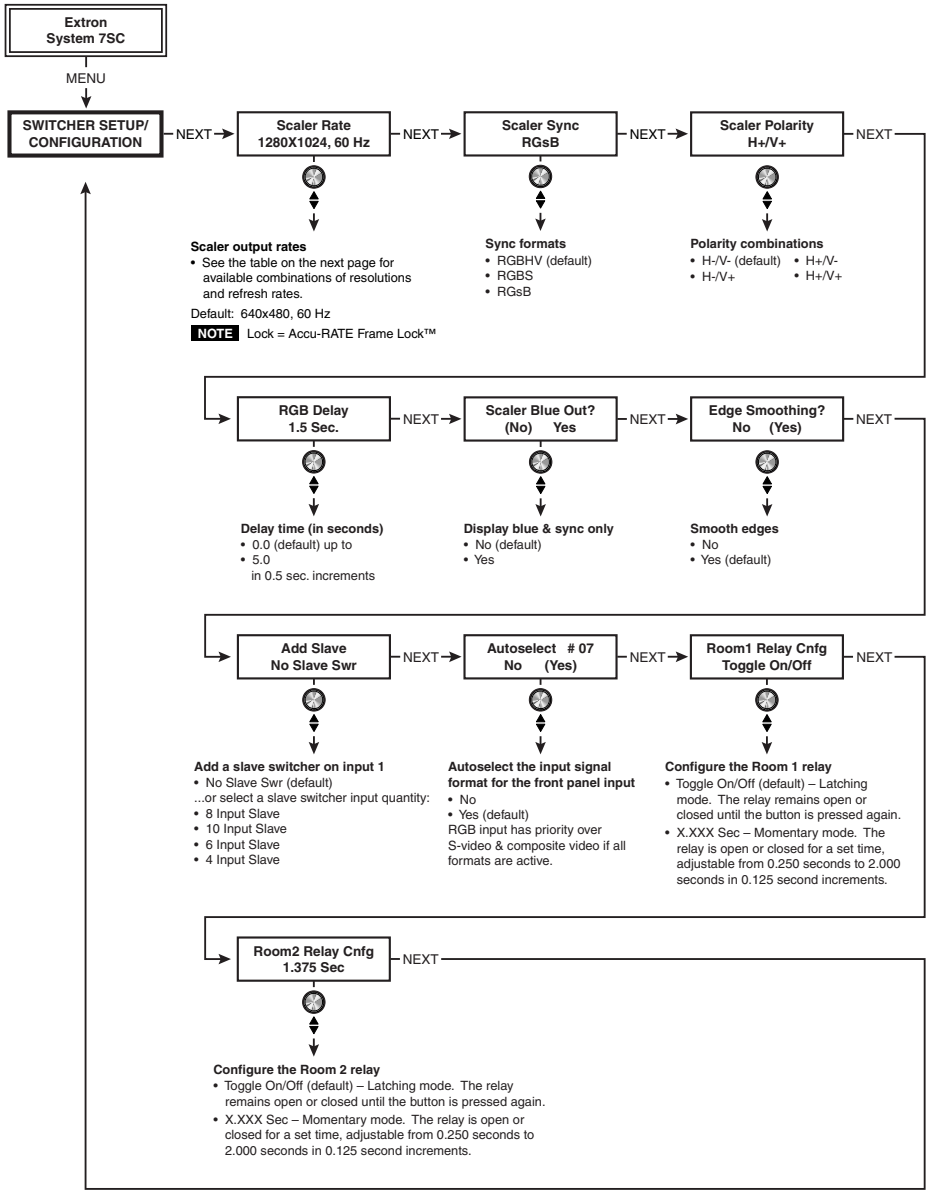
NOTE *From any menu or submenu, after eight seconds of inactivity the System 7SC will save all adjustment settings and time-out to the default menus.*

The main menus are as shown below. Use the Menu key to scroll between them.



Switcher Setup/Configuration

The flowchart below provides an overview of the Switcher Setup/Configuration submenu and the options for each setting.


Extron
System 7SC
MENU
SWITCHER SETUP/
CONFIGURATION
NEXT
Scaler Rate
1280X1024, 60 Hz
Scaler output rates
• See the table on the next page for available combinations of resolutions and refresh rates.
Default: 640x480, 60 Hz
NOTE Lock = Accu-RATE Frame Lock™
Scaler Sync
RGsB
Sync formats
• RGBHV (default)
• RGBS
• RGsB
Scaler Polarity
H+/V+
Polarity combinations
• H-/V- (default)
• H+/V-
• H-/V+
• H+/V+
RGB Delay
1.5 Sec.
Delay time (in seconds)
• 0.0 (default) up to
• 5.0
in 0.5 sec. increments
Scaler Blue Out?
(No) Yes
Display blue & sync only
• No (default)
• Yes
Edge Smoothing?
No (Yes)
Smooth edges
• No
• Yes (default)
Add Slave
No Slave Swr
Add a slave switcher on input 1
• No Slave Swr (default)
...or select a slave switcher input quantity:
• 8 Input Slave
• 10 Input Slave
• 6 Input Slave
• 4 Input Slave
Autoselect # 07
No (Yes)
Autoselect the input signal format for the front panel input
• No
• Yes (default)
RGB input has priority over S-video & composite video if all formats are active.
Room1 Relay Cnfg
Toggle On/Off
Configure the Room 1 relay
• Toggle On/Off (default) – Latching mode. The relay remains open or closed until the button is pressed again.
• X.XXX Sec – Momentary mode. The relay is open or closed for a set time, adjustable from 0.250 seconds to 2.000 seconds in 0.125 second increments.
Room2 Relay Cnfg
1.375 Sec
Configure the Room 2 relay
• Toggle On/Off (default) – Latching mode. The relay remains open or closed until the button is pressed again.
• X.XXX Sec – Momentary mode. The relay is open or closed for a set time, adjustable from 0.250 seconds to 2.000 seconds in 0.125 second increments.

NOTE *If you press the Menu button while a submenu is active, the next main menu will become active. For example, the menu will change from the Switcher Setup/Configuration menu or submenus to the Audio/Video Adjustments main menu.*

NOTE *To return to the default screens, let the System 7SC time-out for 8 seconds, or press the Menu button until the Exit? menu appears, then press the Next button.*

Scaler Rate (resolution and refresh rate)

Rotate the Adjust knob while in the Scaler Rate submenu to select one of the available combinations of scaler output resolutions and refresh (vertical scanning) rates. Selecting Lock enables the Extron Accu-RATE Frame Lock™ (AFL™) (patent pending) feature. Accu-RATE Frame Lock eliminates image tearing and other artifacts of scaling motion video by eliminating frame rate conversion. It exactly matches the output rate of the System 7SC's scaler to the frame rate of the selected input. Select this feature if you will be using motion video sources with a display that is capable of a variety of refresh rates.

The following table shows the available combinations of resolutions and rates.

Available Scaler Output Resolutions and Rates

Resolution	50 Hz	56 Hz	60 Hz	75 Hz	Lock
640 x 480	X		X	X	X
800 x 600	X		X	X	X
832 x 624			X	X	X
848 x 480			X		
852 x 480			X		
1024 x 768	X		X	X	X
1280 x 768		X			
1280 x 1024	X		X		X
1360 x 765			X		
1365 x 1024			X		X
480p	HDTV (60 Hz)				X
720p	HDTV (60 Hz)				X
1080p	HDTV (60 Hz)				X
1080i	HDTV (60 Hz)				X

Scaler Sync (RGB format)

Using the Adjust knob, select the sync format required by the display: RGBHV, RGBS (composite sync), or RGsB (sync on green).

Scaler Polarity (sync polarity)

The display or projector may require a particular combination of horizontal (H) and vertical (V) sync signal polarities. Select the appropriate combination of positive or negative H and V sync by rotating the Adjust knob from within this submenu.

RGB Delay (Triple-Action Switching™)

With Triple-Action Switching, the System 7 switches to the new sync signal before switching RGB (video) signals. That allows the projector to adjust to the new sync timing during a brief delay before displaying the new picture, which will appear without glitches. Triple-Action Switching is also known as video mute switching. Use the Adjust knob to select the blanking period (RGB delay time) from 0 seconds (default) to 5 seconds in half-second steps.

Scaler Blue Out

To aid in setup of the scaler's color and tint, Scaler Adjust Blue Only can be set to Yes so that only sync and blue video signals will be passed to the display. Use the Adjust knob to select this option, which can be used for scaled video output only.

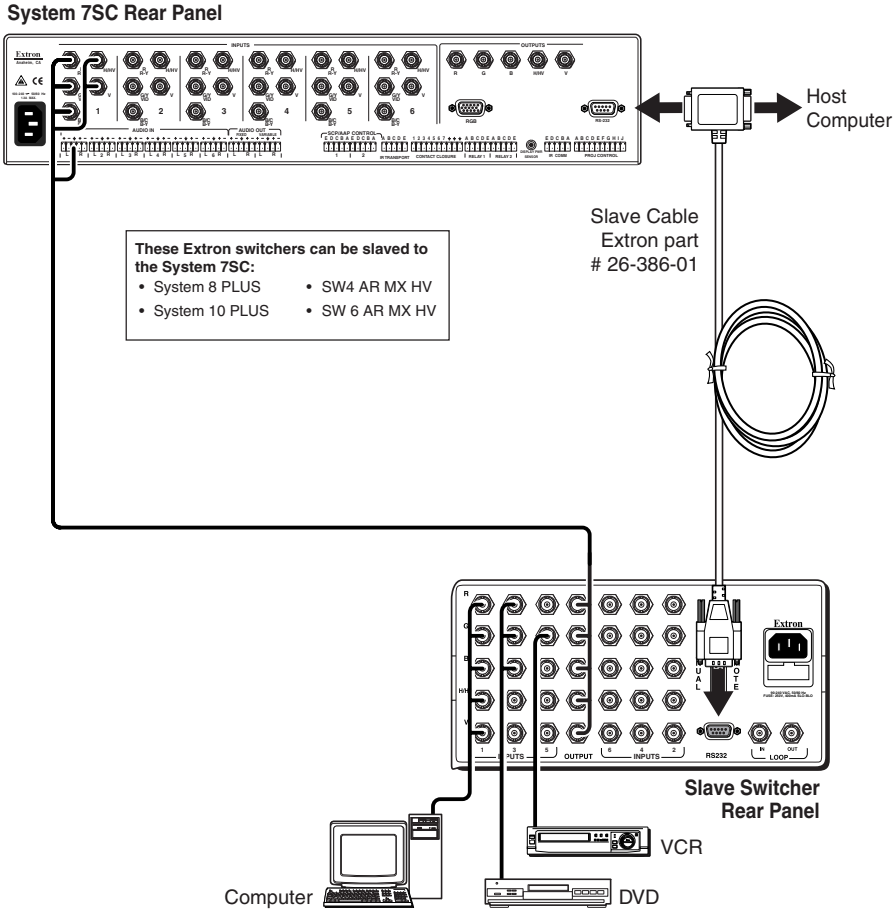
Edge Smoothing

This feature smooths edges of objects in a picture by minimizing the differences between pixels. The default setting is "Yes".

Add Slave (slaving switchers)

To expand the capacity of the System 7SC to a total of up to 16 inputs, connect and configure a slave switcher. A maximum of one Extron switcher can be used.

A slave cable, Extron part # 26-386-01, is required for the RS-232 connection, and the slave's video output must be connected to input 1 of the System 7SC. See "Connecting and Slaving a Switcher" in chapter 2 for cabling instructions, and see the following diagram.


System 7SC Rear Panel
Host Computer
Slave Cable Extron part # 26-386-01
These Extron switchers can be slaved to the System 7SC:
• System 8 PLUS
• System 10 PLUS
• SW4 AR MX HV
• SW 6 AR MX HV
Slave Switcher Rear Panel
VCR
Computer
DVD

The System 7SC with a slaved switcher

After the slave switcher has been connected to the System 7 and both switchers are powered on, select the input quantity (10, 8, 6, or 4 inputs) that corresponds to the attached slave switcher from the Add Slave submenu of the Switcher Setup/ Configuration menu.

Autoselect #7 (front panel input automatic signal type selection)

The front panel input (input 7) accepts video and *one* audio input. Only one video format and one audio port will be active at a time on the front panel.

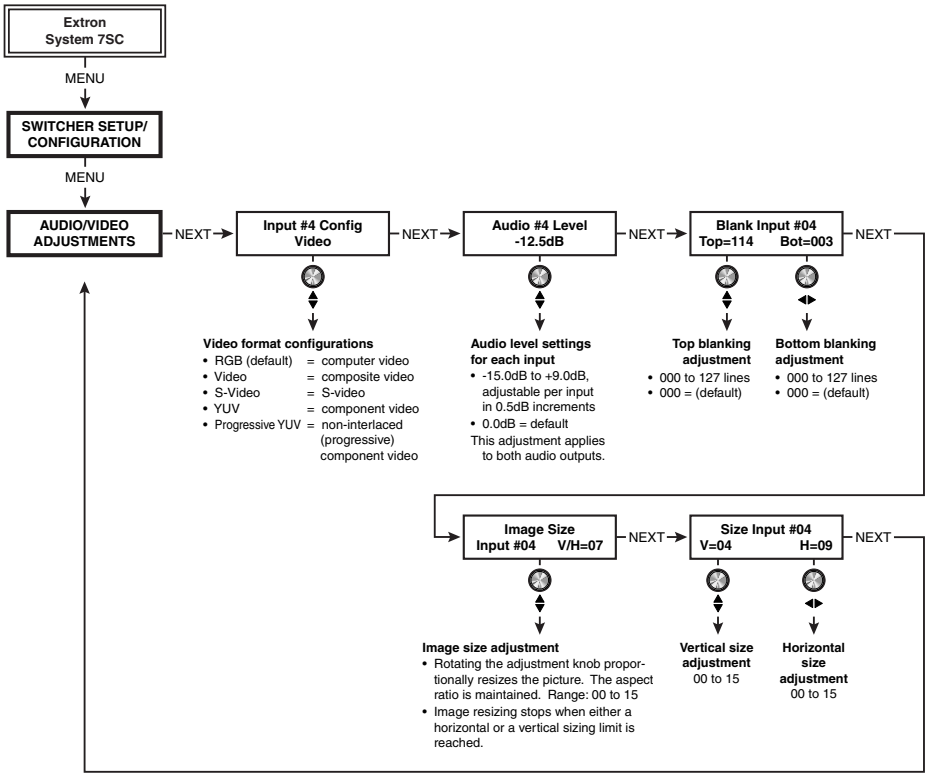
The active input type (RGB, S-video, or composite video) can be specified via the LCD menu, or, in autoselect mode, the System 7SC automatically detects the active video signal and selects that signal type whenever input 7 is active/selected. An

LED near each video connector indicates which input type is active. Select Yes from the Autoselect #7 submenu to activate autoselection.

NOTE *If the autoselect feature is on, the last input (input 7 if no slave is attached) is selected, and video signals are present at all ports for that input, computer video (RGB) will be selected as the default source.*
Inputs are autoselected as follows:
- *RGB input (highest priority),*
- *S-video input,*
- *composite video input (lowest priority).*

NOTE *The LCD will display Autoselect #7 if the System 7 is not set up for a slaved switcher. If a switcher is slaved to the System 7, the LCD will display Autoselect #10, Autoselect #12, Autoselect #14, or Autoselect #16, depending on the size of the slaved switcher.*

Audio/Video Adjustments


Extron System 7SC
MENU
SWITCHER SETUP/ CONFIGURATION
MENU
AUDIO/VIDEO ADJUSTMENTS
NEXT
Input #4 Config Video
NEXT
Audio #4 Level -12.5dB
NEXT
Blank Input #04 Top=114 Bot=003
NEXT
Video format configurations
• RGB (default) = computer video
• Video = composite video
• S-Video = S-video
• YUV = component video
• Progressive YUV = non-interlaced (progressive) component video
Audio level settings for each input
• -15.0dB to +9.0dB, adjustable per input in 0.5dB increments
• 0.0dB = default
This adjustment applies to both audio outputs.
Top blanking adjustment
• 000 to 127 lines
• 000 = (default)
Bottom blanking adjustment
• 000 to 127 lines
• 000 = (default)
Image Size Input #04 V/H=07
NEXT
Size Input #04 V=04 H=09
NEXT
Image size adjustment
• Rotating the adjustment knob proportionally resizes the picture. The aspect ratio is maintained. Range: 00 to 15
• Image resizing stops when either a horizontal or a vertical sizing limit is reached.
Vertical size adjustment 00 to 15
Horizontal size adjustment 00 to 15

Input Config(uration) (signal format)

1. From within the Input Configuration submenu, press the button of the input you wish to configure. The input's number will appear on the LCD screen.
2. Rotate the Adjust knob to select the appropriate video format (RGB, composite video, S-video, component video, or progressive component video) for each input.
3. Repeat steps 1 and 2 as needed to configure each input.

Audio Level

From this submenu audio levels can be adjusted per input from -15dB to +9dB in 0.5dB increments. This allows the signal to be boosted or trimmed to a consistent

output level so that there is no noticeable difference in level when switching between inputs. This adjustment applies to both the Fixed and the Variable audio output.

The Volume adjustment, which affects the Variable audio output only, is applied to all inputs equally, and it is an attenuation applied in addition to the per-input audio level adjustments made using this submenu.

Blank Input (blanking adjustment)

To remove noise or extraneous material such as closed captioning by removing scan lines at either the top or bottom of the screen, adjust the top blanking or bottom blanking. Rotate the vertical shift knob to set the number of lines removed from top of the picture. Rotate the horizontal shift knob to set the number of lines removed from the bottom.

Image Size

To proportionately resize the displayed picture without altering the aspect ratio, rotate either the vertical (▲▼) or the horizontal (◄►) shift knob while in the Image Size submenu. Whichever knob is used, the effect is the same: proportional picture sizing.

NOTE *During Image Size adjustment, if a horizontal or a vertical size limit is reached, the sizing stops, and the aspect ratio remains unchanged. The LCD screen displays Min or Max.*

Size Input

To resize a picture, enter the Size submenu, then rotate the vertical(▲▼) shift knob to make the picture taller or shorter, or rotate the horizontal (◄►) shift knob to make the picture wider or narrower. The amount of adjustment available depends on the selected output rate.

NOTE *If a sizing limit has been reached, the LCD screen will display Min or Max.*

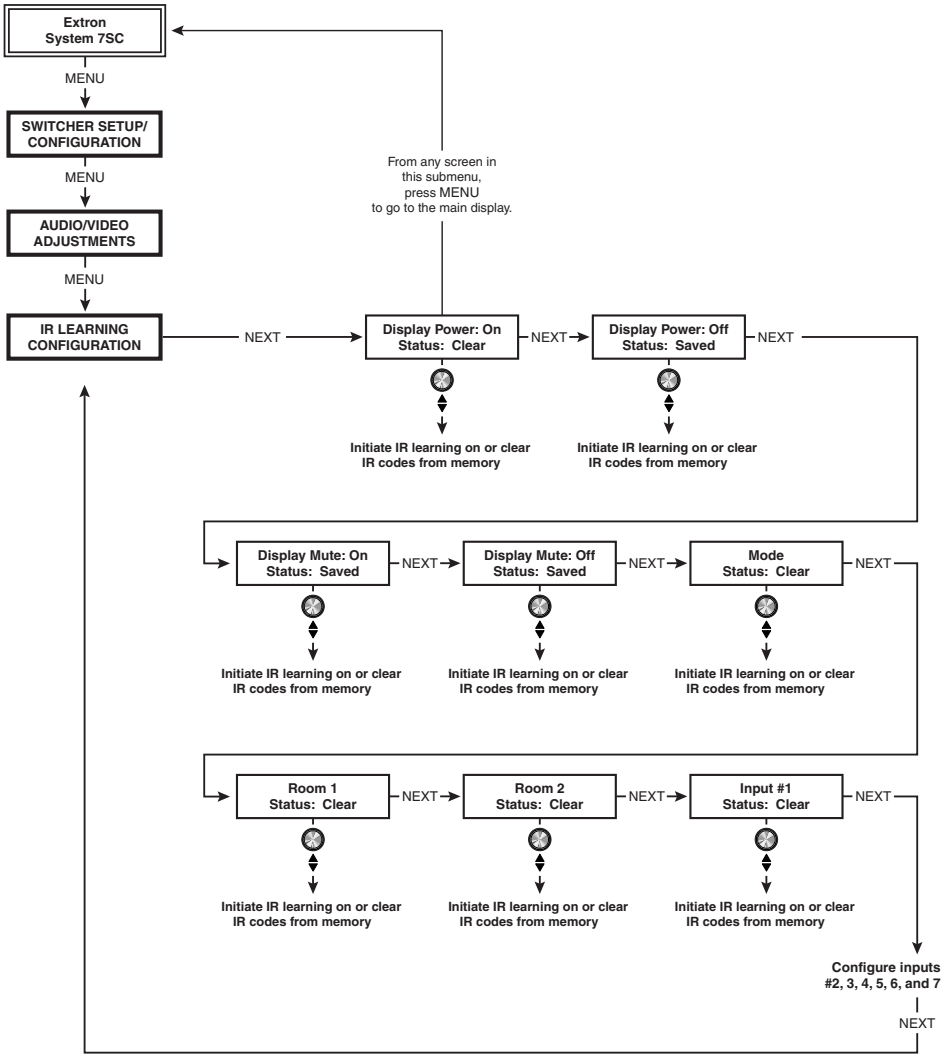
IR Learning Configuration

Via an RS-232 connection, infrared commands can be downloaded into the switcher as driver files from Extron's Web site. The System 7SC can also "learn" IR commands directly from a display's remote control. IR learning is convenient for installing new or updated commands into the System 7SC while in the field.

IR commands can be associated with any front panel control (Display Power, Display Mute, Mode, Room 1, Room 2) or input selection button. Pressing one of those buttons will only cause an IR command to be executed if a command has been programmed into the System 7SC and associated with that button.

The Display Power and Display Mute buttons each have two memory blocks for IR or RS-232 information in order to meet the needs of many displays that require separate commands for power on/power off and mute on/mute off.

The IR Learning Configuration menu provides a way to initiate IR Learning and to designate which front panel button will have which command associated with it. The flowchart below shows how to move through the IR Learning Configuration submenu.

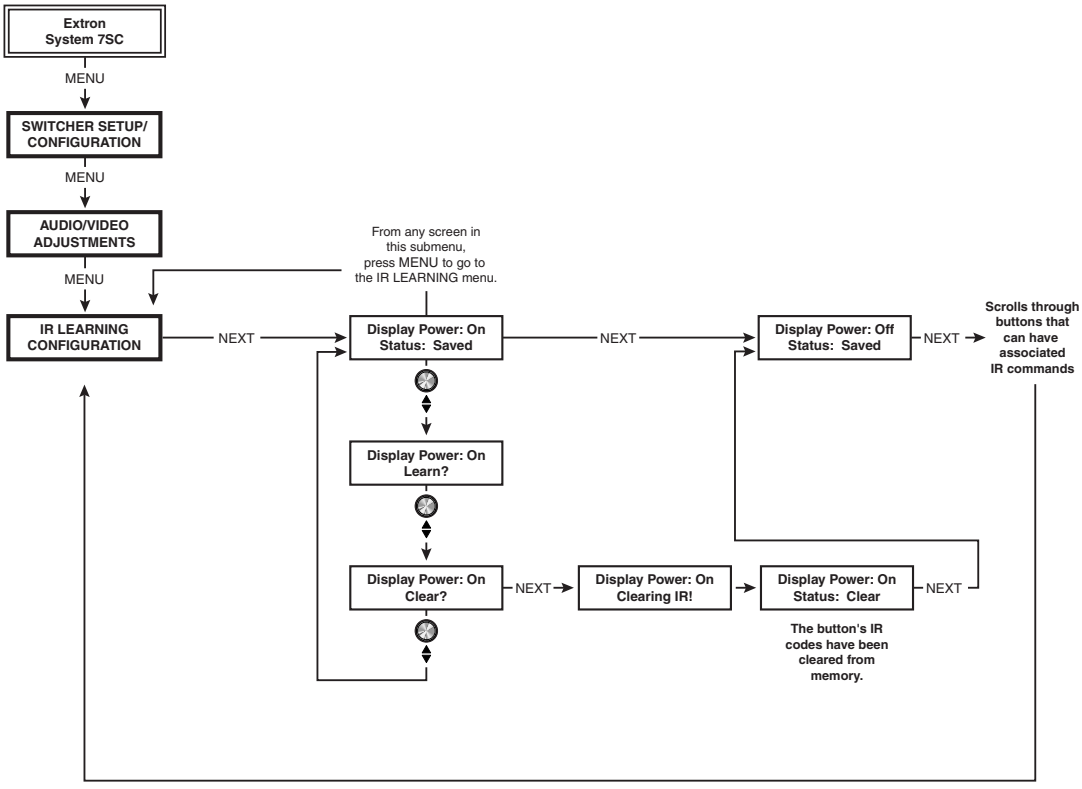

Extron System 7SC
MENU
SWITCHER SETUP/ CONFIGURATION
MENU
AUDIO/VIDEO ADJUSTMENTS
MENU
IR LEARNING CONFIGURATION
NEXT
From any screen in this submenu, press MENU to go to the main display.
Display Power: On Status: Clear
NEXT
Display Power: Off Status: Saved
NEXT
Initiate IR learning on or clear IR codes from memory
Initiate IR learning on or clear IR codes from memory
Display Mute: On Status: Saved
NEXT
Display Mute: Off Status: Saved
NEXT
Mode Status: Clear
NEXT
Initiate IR learning on or clear IR codes from memory
Initiate IR learning on or clear IR codes from memory
Initiate IR learning on or clear IR codes from memory
Room 1 Status: Clear
NEXT
Room 2 Status: Clear
NEXT
Input #1 Status: Clear
NEXT
Initiate IR learning on or clear IR codes from memory
Initiate IR learning on or clear IR codes from memory
Initiate IR learning on or clear IR codes from memory
Configure inputs #2, 3, 4, 5, 6, and 7
NEXT

Navigating through the IR Learning Configuration menu

Clearing IR commands from memories

The memory for each Display, Room, or input selection button can either be clear (empty, no stored commands are associated with the button) or saved (containing an IR command that is saved in nonvolatile memory). To clear IR commands from a button's memory:

1. From the main menu press the Menu button until the IR Learning Configuration menu appears.
2. Scroll through the submenu to the desired button by pressing the Next button.
3. Rotate the Adjust knob (▲▼) to toggle from the button's status to the Clear command.
4. Press the Next button to clear the IR commands from that Display, Room, or input selection button's memory.
5. Press Next to scroll to another button, or press Menu or allow the System 7 to time out to the main screen.

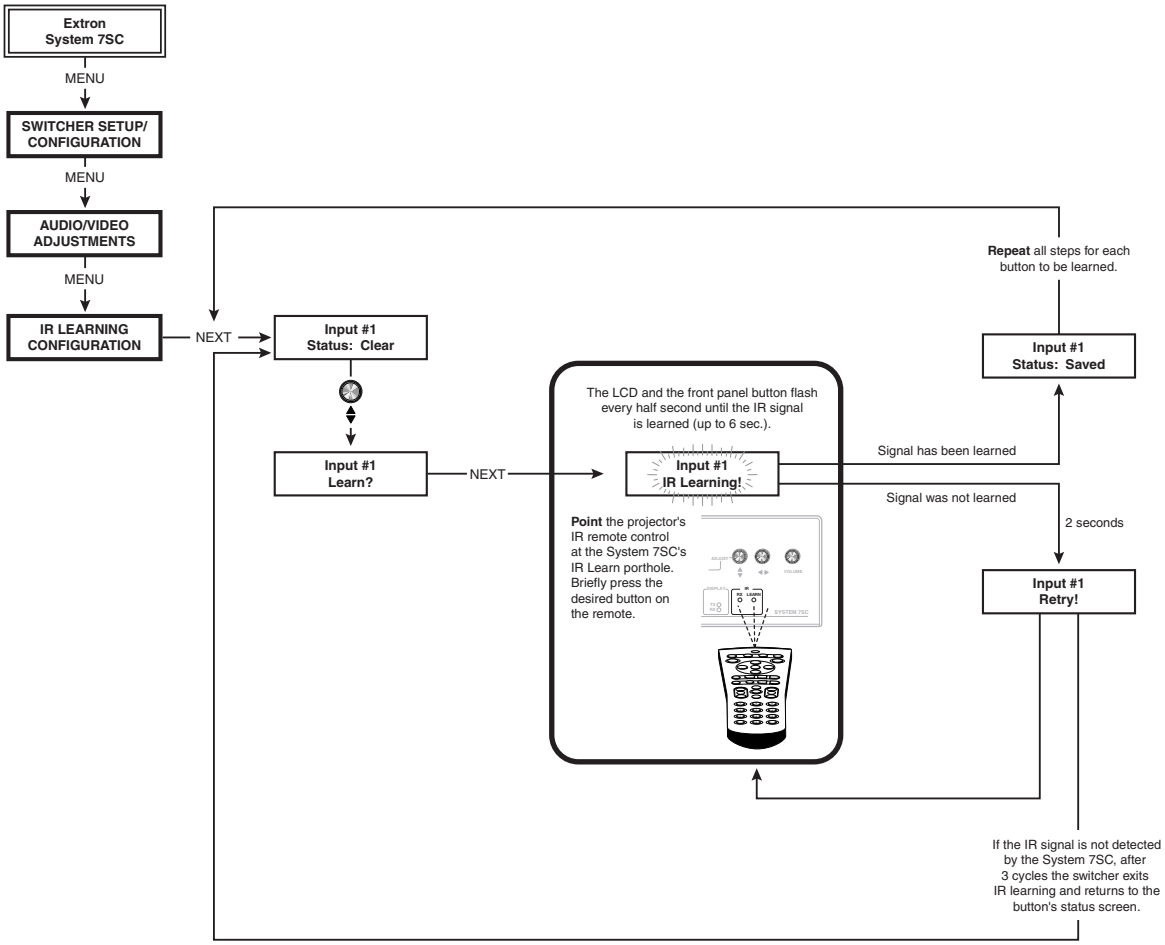


Clearing IR commands from a button's memory

Initiating IR learning

If an IR command from the display's remote control has not already been programmed into the System 7, a driver is unavailable, or an update is needed, IR learning is the best, fastest way to load that command into the System 7. Use the flowchart below as a guide to IR learning.

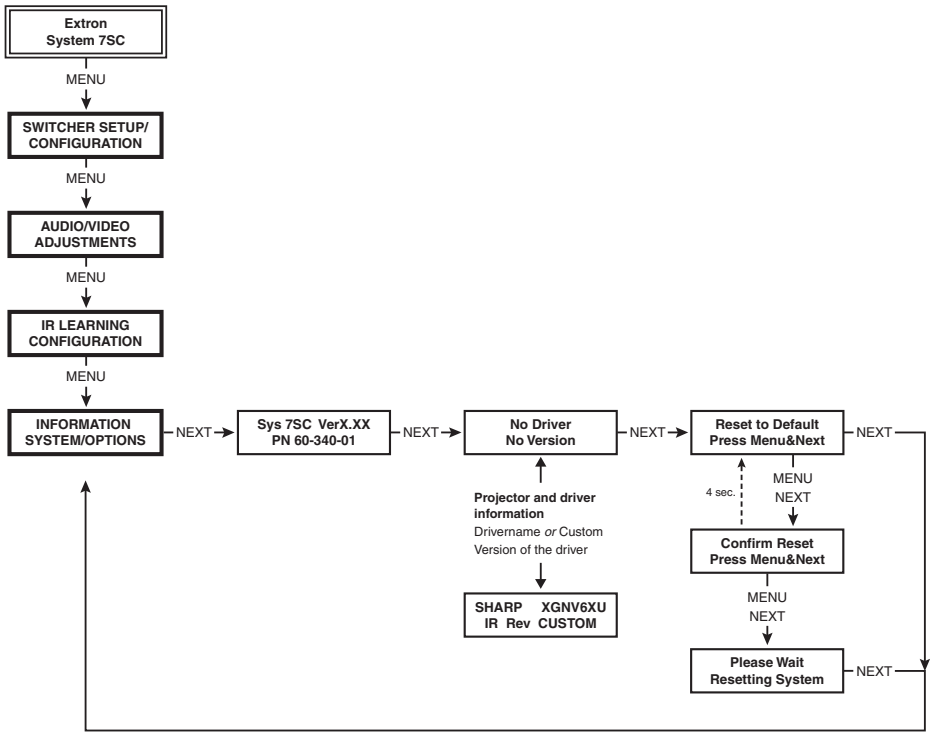
IR learning will automatically replace any old commands from the buttons you are programming. If no IR signal is received by the System 7 during IR learning, the previously stored IR commands are not cleared; they remain in that button's memory.


Extron
System 7SC
MENU
SWITCHER SETUP/
CONFIGURATION
MENU
AUDIO/VIDEO
ADJUSTMENTS
MENU
IR LEARNING
CONFIGURATION
NEXT
Input #1
Status: Clear
Input #1
Learn?
NEXT
The LCD and the front panel button flash every half second until the IR signal is learned (up to 6 sec.).
Input #1
IR Learning!
Point the projector's IR remote control at the System 7SC's IR Learn porthole. Briefly press the desired button on the remote.
Signal has been learned
Signal was not learned
2 seconds
Input #1
Retry!
Input #1
Status: Saved
Repeat all steps for each button to be learned.
If the IR signal is not detected by the System 7SC, after 3 cycles the switcher exits IR learning and returns to the button's status screen.

Initiating IR learning

Information/System Options

The Information/System Options menu provides information on the System 7SC (firmware version and part number) and on the projector and driver. The switcher can also be reset to factory default settings via this menu.



Reset to Default (clearing settings and adjustments)

Resetting the System 7SC clears all the user-made settings and adjustments from the System 7's memory and replaces them with the factory default settings. This includes settings for audio level, color, tint, brightness, contrast, detail, and centering. All inputs will be reset to RGB input.

When the system is reset, the IR and RS-232 commands and drivers will remain in memory.

Global system reset

A global system reset clears and resets all of the System 7SC's settings, including the settings/adjustments discussed above and all programming, IR and RS-232 commands, and drivers. To perform a global reset, press and hold the Menu and Next keys while connecting the System 7 to an AC power source.

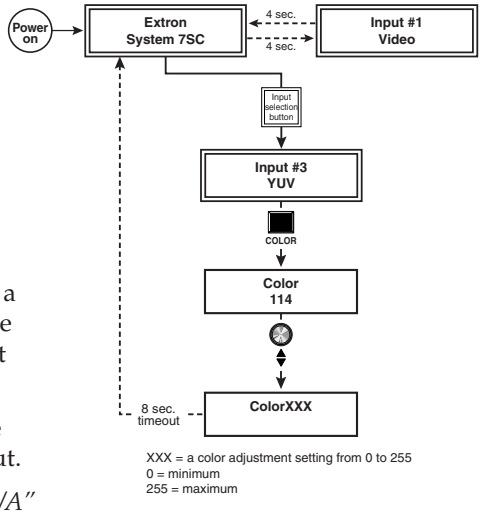
Image adjustments

All the image adjustments are stored in memory and can be set separately for each input. Image adjustments apply to scaled video output only; RGB signals are passed through without adjustments.

Color, tint, brightness, contrast, detail

To adjust an image for color, tint, brightness, contrast, or detail, follow the steps on the next page. An illustration of making color adjustments shows the process, which is the same for all the image adjustments.

1. Press the input selection button of the input you wish to adjust.
2. Press the appropriate image adjustment button (Color, Tint, Bright, Cont, or Detail). The LCD display will show the name of the adjustment and the number of the current setting.
3. Rotate the Adjust knob (▲▼) to select a level from 0 (Min) to 255 (Max). The switcher will time-out to the default menu after 8 seconds.
4. Repeat steps 2 and 3 for each image adjustment to be made for that input.

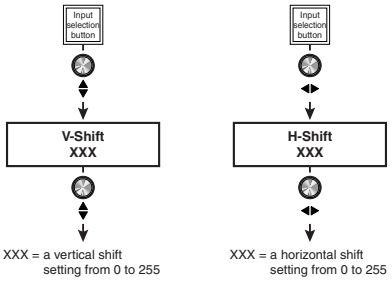


NOTE *The LCD display may show "N/A" (not applicable) in place of a number if that adjustment doesn't apply to the input's video format. For example, the tint adjustment applies only to NTSC composite video, so N/A will be displayed if the Tint button is pressed when a PAL composite video input or an RGB input is selected.*

Centering

To adjust centering:

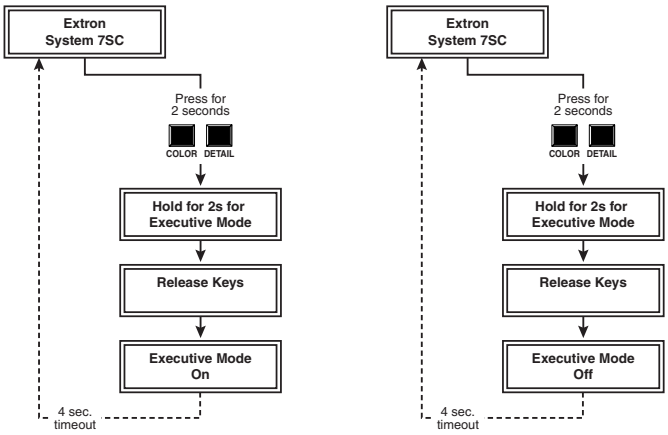
1. Press the input selection button of the input to be adjusted.
2. Rotate the vertical (▲▼) or horizontal (◄►) shift knob while watching the display. The LCD screen will appear as shown at right during centering adjustment.


Input selection button
V-Shift XXX
XXX = a vertical shift setting from 0 to 255
Input selection button
H-Shift XXX
XXX = a horizontal shift setting from 0 to 255

NOTE *The shift knobs have no mechanical limits to their rotation. The shift values range from 0 to 255, and the picture will stop moving on screen when these limits are reached.*

Executive mode

To prevent accidental changes to settings, follow the steps shown in the illustration on the next page to enable the System 7SC's executive mode. Executive mode locks all front panel functions except input selection and control commands (display and room functions) and disables setup menu options. The System 7SC's front panel and the IR 701 are both affected by executive mode. When executive mode is active, all functions and adjustments can still be made through RS-232 control. For details on RS-232 control, see chapter four.



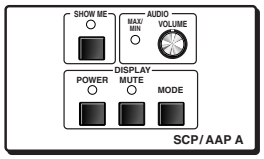
Enabling and disabling executive mode

Remote Control of the System 7SC

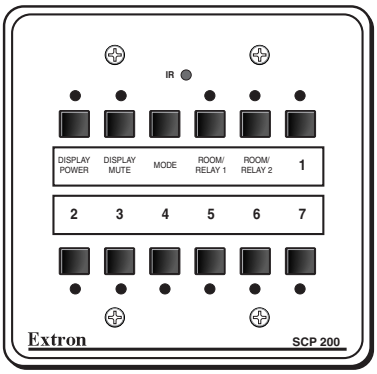
The System 7SC can be controlled by using its front panel controls; the included IR 701 infrared remote control; optional SCP/AAP A, SCP 200, and/or SCP 250 remote control pads; or an RS-232 control device or computer.

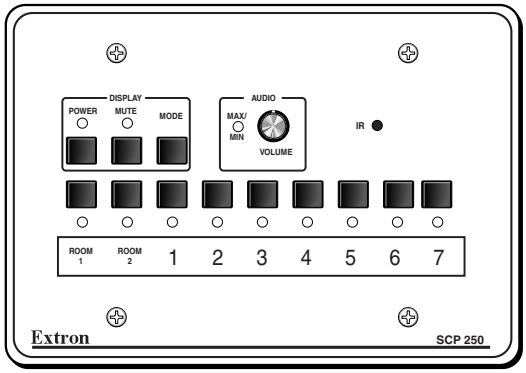
SCP control pads

The Extron SCP/AAP A control pad replicates a few of the front panel controls. It provides Display Power, Display Mute, and Display Mode buttons, and a Show Me button. Pressing the Show Me button selects a specific input, which is determined by setting the DIP switch on the control pad's circuit board. Another control device must be used to select any other input, make adjustments, or configure the switcher.



The SCP 200, shown at left below, replicates the control (Display Power, Display Mute, display Mode, Room 1, Room 2) and input selection buttons. The SCP 200 has an IR receiver device for receiving commands for the System 7SC from the IR 701.



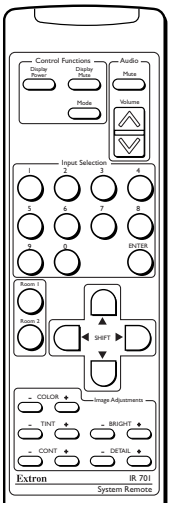


The SCP 250, shown at right above, includes all the features of the SCP 200 and adds a volume control knob and LED.

NOTE *Setup and adjustments cannot be performed from the SCP 200 or SCP 250.*

NOTE *A total of up to sixteen SCP/AAP A, SCP 200, or SCP 250 control pads can be linked together and connected to the System 7SC switcher. See the SCP's user's manual for details on how to configure and link SCP control pads.*

IR 701 infrared remote control



The IR 701, shown at right, replicates all of the front panel controls except the Menu and Next buttons. Unless executive mode is enabled, adjustments can be made from the IR 701, but you must use the System 7's front panel or the Windows-based control program (via an RS-232 device) to configure and program the switcher. See chapter four, "Serial Communication", for details.

The topmost part of the IR 701 includes the control functions (Display Power, Mute, Mode) and the master volume control (as ^ and v buttons). The middle portion of the IR 701 features the input selection buttons, Room 1, Room 2, and centering/shift buttons. The bottom part contains the adjustment controls for color, tint, brightness, contrast, and detail adjustments. The adjustment functions will be disabled if executive mode is on.

Selecting an input

To use the IR 701 to select an input, press the input number, then press the Enter key. For example, if a switcher is slaved to the System 7 and you want to select input 15, press 1, press 5, then press Enter. The System 7 will switch to input 15.

If you select an input that doesn't exist, such as input 8 when a slave switcher is not connected, the switcher will ignore the command.

Chapter Four

Serial Communication

RS-232 Programmer's Guide

Control Software for Windows

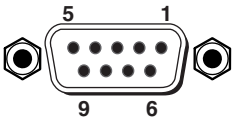
Serial Communication

The System 7SC can be remotely controlled via a host computer or other device (such as a control system) attached to the rear panel RS-232 connector. The control device (host) can use either Extron's Simple Instruction Set (SIS) commands or the graphical control program for Windows.

The switcher uses a protocol of 9600 baud, 1 stop bit, no parity, and no flow control.

The rear panel RS-232 9-pin D connector has the following pin assignments:

Pin	RS-232 function	Description
1	–	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	Tx 2	Transmit data
5	Gnd	Signal ground
6	–	No connection
7	–	No connection
8	Rx 2	Receive data
9	–	No connection



DB9 Pin Locations
Female

NOTE *Pins 4 and 8 on the host connector must be used for Tx2 and Rx2 only (for communicating with a slaved switcher), and not for other signals in the host system. If needed, disable or disconnect pins 4 and 8 on the host side.*

RS-232 Programmer's Guide

Host-to-switcher communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. When the System 7SC determines that a command is valid, it executes the command and sends a response to the host device. All responses from the switcher to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-initiated messages

When a local event such as a front panel (or SCP control pad) selection or adjustment takes place, the System 7SC switcher responds by sending a message to the host. No response is required from the host. The switcher-initiated messages are listed here (underlined).

(C) Copyright 2001, Extron Electronics, System 7SC, Vx.xx ↵
The System 7SC sends the copyright message when it first powers on. Vx.xx is the firmware version number.

Chn[X1] ↵ (where [X1] is the input number)
The System 7SC sends this response when an input is switched. C = both audio and video were switched.

Error responses

When the switcher receives a valid SIS command, it executes the command and sends a response to the host device. If the System 7SC is unable to execute the command because the command is invalid or it contains invalid parameters, it returns an error response to the host.

The error response codes and their descriptions are as follows:

E01 – Invalid input channel number (the number is too large)
E10 – Invalid command
E13 – Invalid value (the number is out of range/too large)
E16 – Unit is busy
E23 – Checksum error.

Using the command/response tables

The command/response tables on the next page list valid command ASCII codes, the switcher's responses to the host, and a description of the command's function or the results of executing the command. *Except* when setting audio gain/attenuation, upper and lower case characters may be used interchangeably in the command field.

ASCII to HEX Conversion Table										Esc	1B	CR	ØD	LF	ØA
	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	l	7C	}	7D	~	7E	DEL	7F

ASCII to Hex conversion table

The ASCII to HEX conversion table at left is for use with the command/response tables.

The command/response tables use symbols (defined below) to represent variables.

Symbol definitions

- ↵ = CR/LF (carriage return/line feed) (hex 0D 0A)
- • = Space
- Esc = Escape key
- X1 = Specific input number (0 through 7 if no slave is attached, 0 to 16 maximum with a slaved 10-input switcher)
  0 = no connection
  1 = input 1, 2 = input 2, and so forth
- X2 = 0 = off, 1 = on
- X3 = Display power status (0 through 3)
  0 = display power is off
  1 = display power is on
  2 = display is powering down
  3 = display is powering up
- X4 = Video signal type (0 through 7)
  0 = RGB
  1 = composite video
  2 = composite video
  3 = S-video
  4 = S-video
  5 = component video (YUV)
  6 = component video (YUV)
  7 = component video (YUV), progressive
- X5 = One through the maximum possible number of inputs (1 through 7 up to 16) for the connected equipment (7 for a stand-alone System 7, 16 if a 10-input switcher is slaved to the System 7) See "Connecting and Slaving a Switcher" in chapter two.
- X6 = Audio gain (0 through 18) in ½ dB steps
- X7 = Audio attenuation (1 through 30) in ½ dB steps
- X8 = Controller firmware version (listed to two decimal places e.g.: x.xx)
- X9 = Numeric value (-15 through +9) in dB
- X10 = Picture adjustment range (0 through 255)
- X11 = Scaler output rate

1 = 640x480 @ 50 Hz	17 = 1024x768 @ Lock
2 = 640x480 @ 60 Hz	18 = 1280x768 @ 56 Hz
3 = 640x480 @ 75 Hz	19 = 1280x1024 @ 50 Hz
4 = 640x480 @ Lock*	20 = 1280x1024 @ 60 Hz
5 = 800x600 @ 50 Hz	21 = 1280x1024 @ Lock
6 = 800x600 @ 60 Hz	22 = 1360x765 @ 60 Hz
7 = 800x600 @ 75 Hz	23 = 1365x1024 @ 60 Hz
8 = 800x600 @ Lock	24 = 1365x1024 @ Lock
9 = 832x624 @ 60 Hz	25 = 480p (HDTV), 60 Hz
10 = 832x624 @ 75 Hz	26 = 480p @ Lock
11 = 832x624 @ Lock	27 = 720p (HDTV), 60 Hz
12 = 848x480 @ 60 Hz	28 = 720p @ Lock
13 = 852x480 @ 60 Hz	29 = 1080p (HDTV), 60 Hz
14 = 1024x768 @ 50 Hz	30 = 1080p @ Lock
15 = 1024x768 @ 60 Hz	31 = 1080i (HDTV), 60 Hz
16 = 1024x768 @ 75 Hz	32 = 1080i @ Lock

*__NOTE:__ Lock is Accu-RATE Frame Lock™

- X12 = Detected input signal standard (0 through 4)
  0 = none
  1 = NTSC 3.58
  2 = PAL
  3 = NTSC 4.43
  4 = SECAM
  – = not applicable (occurs when the input is set for RGB, YUV, or progressive YUV)
- X13 = Detail level (0 through 63)
- X14 = Volume adjustment range (0 through 100%)
- X15 = Adjustment range (1 through 15)
- X16 = Executive mode status (0 through 2)
  0 = disabled (executive mode off, normal mode on)
  1 = enabled, image adjustments are locked
  2 = enabled, all front panel features are locked
- X17 = Blanking adjustment range (0 through 127 lines)

Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Input selection			
Select both video and audio	X1 !	Chn X1 ↵	Video & audio input X1
Example:	6!	Chn06↵	*Example*: select input 6 video & audio
Select audio only	X1 $	Aud X1 ↵	Audio input X1
Select video only	X1 &	Vid X1 ↵	Video input X1
Display (projector) power			
Turn display power on	1P	Pwr X3 ↵	On (discrete)
Turn display power off	0P	Pwr X3 ↵	Off (discrete)
View display power status	P	Pwr X3 ↵	Show the display power status.
Example:	P	Pwr2↵	
Display mute			
Turn display mute on	1M	Mut X2 ↵	Mute
Example:	1M	Mut1↵	
Turn display mute off	0M	Mut X2 ↵	Unmute
View display mute status	M	Mut X2 ↵	Show the display mute status.
Display mode			
Toggle display mode	J	Mde ↵	Toggle the display mode on/off.
Room function			
Turn room relay 1 on	1*1 O	Rly 1* X2 ↵	Relay 1 on (discrete)
Turn room relay 1 off	1*0 O	Rly 1* X2 ↵	Relay 1 off (discrete)
Turn room relay 2 on	2*1 O	Rly 2* X2 ↵	Relay 2 on (discrete)
Example:	2*1O	Rly2*1↵	
Turn room relay 2 off	2*0 O	Rly 2* X2 ↵	Relay 2 off (discrete)
View relay 1 status	1O	Rly 1* X2 ↵	Show the status of relay 1.
Example:	1O	Rly1*0↵	
View relay 2 status	2O	Rly 2* X2 ↵	Show the status of relay 2.
Example:	2O	Rly2*1↵	
Audio gain/attenuation			
Set audio gain	X6 G	Aud X9 ↵	Set a single input's gain (in dB).
Example:	18G	Aud+09.0↵	*Example*: set gain to +9dB
Set audio attenuation	X7 g	Aud X9 ↵	Set an input's attenuation (in dB).
Example:	23g	Aud-11.5↵	*Example*: set attenuation to -11.5dB
View audio channel level	G	Aud X9 ↵	Show an input's audio level.
Volume adjustment for the Variable output			
Set the Variable output's volume	X14 V	Vol X14 ↵	Specify the volume for the variable audio output.
Example:	82V	Vol082 ↵	*Example*: set volume to 82
Increment	+V	Vol X14 ↵	Increase variable audio output.
Decrement	-V	Vol X14 ↵	Decrease variable audio output.
View the Variable output's level	V	Vol X14 ↵	Show the variable output volume.
Audio mute			
Mute on (fixed & variable audio outputs)	1Z	Amt X2 ↵	Mute both audio outputs.
Example:	1Z	Amt1↵	
Mute off (fixed & variable audio outputs)	0Z	Amt X2 ↵	Unmute all audio outputs.
View audio mute status	Z	Amt X2 ↵	Show the status of audio mute.

Command/response table for SIS commands (continued)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Video configuration			
Set video signal type	X5*X4\	Typ X4 = ____↵	Set the input signal type. (Type = Vid, Y-C, YUV, YUVp, or RGB)
Example:	2*7\	Typ7=YUVp↵	*Example*: set input 2 to progressive component video
View the video signal type	X5\	X4 ↵	Show the video signal type.
Example:	6\	Typ1=Vid↵	*Example*: show input 6 video type.
Color			
Set a specific color value	X10 C	Col X10 ↵	Specify a color adjustment level.
Example:	47C	Col047↵	*Example*: set the color adjustment to 47.
Increment	+C	Col X10 ↵	Increase color adjustment level.
Decrement	-C	Col X10 ↵	Decrease color adjustment level.
View the color value	C	Col X10 ↵	Show the color adjustment.
Tint			
Set a specific tint value	X10 T	Tin X10 ↵	Specify a tint adjustment level.
Example:	176T	Tin176↵	*Example*: set the tint to 176.
Increment	+T	Tin X10 ↵	Increase tint adjustment level.
Decrement	-T	Tin X10 ↵	Decrease tint adjustment level.
View the tint value	T	Tin X10 ↵	Show the tint adjustment.
Contrast			
Set a specific contrast value	X10 ^	Con X10 ↵	Specify the contrast adjustment.
Increment	+^	Con X10 ↵	Increase the contrast.
Decrement	-^	Con X10 ↵	Decrease the contrast.
View the contrast value	^	Con X10 ↵	Show the contrast setting.
Brightness			
Set a specific value	X10 Y	Brt X10 ↵	Specify the brightness adjustment.
Increment	+Y	Brt X10 ↵	Increase the brightness.
Decrement	-Y	Brt X10 ↵	Decrease the brightness.
View the brightness value	Y	Brt X10 ↵	Show the brightness setting.
Detail mode			
Set the detail level	X13 D	Det X13 ↵	Specify the detail level.
View the detail value	D	Det X13 ↵	Show the detail setting.
Horizontal shift			
Set horizontal position	X10 H	Hph X10 ↵	Specify the horizontal position.
Increment	+H	Hph X10 ↵	Shift right.
Decrement	-H	Hph X10 ↵	Shift left.
View the horizontal pos. value	H	Hph X10 ↵	Show the horizontal position.
Vertical shift			
Set the vertical position	X10 /	Vph X10 ↵	Specify the vertical position.
Increment up	+/	Vph X10 ↵	Shift up.
Increment down	-/	Vph X10 ↵	Shift down.
View the vertical pos. value	/	Vph X10 ↵	Show the vertical position.

(Continued)

Command/response table for SIS commands (continued)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Image size			
Specify image size, maintain aspect ratio	X15 {	Isz X15 ↵	Set picture height & width together.
Size up, maintain aspect ratio	+{	Isz X15 ↵	Increase height & width equally.
Size down, maintain aspect ratio	-{	Isz X15 ↵	Decrease height & width size equally.
View the image size value	{	Isz X15 ↵	Show the image size setting.
Horizontal size			
Specify the horizontal size	X15 :	Hsz X15 ↵	Set the picture width.
Increase the horizontal size	+:	Hsz X15 ↵	Widen the picture.
Decrease the horizontal size	-:	Hsz X15 ↵	Make the picture narrower.
View the horizontal size value	:	Hsz X15 ↵	Show the horizontal size setting.
Vertical size			
Specify the vertical size	X15 ;	Vsz X15 ↵	Set the picture height.
Increase the vertical size	+;	Vsz X15 ↵	Make the picture taller.
Decrease the vertical size	-;	Vsz X15 ↵	Make the picture shorter.
View the vertical size value	;	Vsz X15 ↵	Show the vertical size setting.
Top blanking			
Specify a top blanking value	X17 (	Blt X17 ↵	Set the number of lines to blank at the top of the picture.
Increase the top blanking value	+(	Blt X17 ↵	Increase the # of top lines blanked.
Decrease the top blanking value	-(	Blt X17 ↵	Decrease the # of top lines blanked.
View the top blanking value	(	Blt X17 ↵	Show the number of lines that are blanked at the top of the picture.
Bottom blanking			
Specify a bottom blanking value	X17)	Blb X17 ↵	Set the number of lines to blank at the bottom of the picture.
Increase the bottom blanking value	+)	Blb X17 ↵	Increase the number of lines blanked at the bottom.
Decrease the bottom blanking value	-)	Blb X17 ↵	Decrease the number of bottom lines blanked.
View the bottom blanking value	)	Blb X17 ↵	Show the # of bottom lines that are blanked.
Scaler rate			
Set the output rate	X11 =	Rte X11 ↵	Select a scaler output scan rate.
View the output rate	=	Rte X11 ↵	Show the scaler output rate.
Freeze			
Enable	1F	Frz1 ↵	Output a "frozen" video image.
Disable	0F	Frz0 ↵	Turn off freeze (output motion).
View the freeze status	F	Frz X2 ↵	Show the freeze status.
Example:	F	Frz0↵	

Command/response table for SIS commands (continued)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Executive mode			
Disable	0X	Exe0 ↵	Adjustments & selections can be made from the front panel.
Enable (lock image adjustments)	1X	Exe1 ↵	Lock front panel adjustments; adjust image via RS-232 only.
Enable (lock selection & adjustments)	2X	Exe2 ↵	Lock all front panel controls (adjustments & input selection); adjust via RS-232 only, select via RS-232 or IR 701.
View the executive mode status	X	Exe X16 ↵	Show executive mode status.
Example:	X	Exe0 ↵	
Firmware version, part number & information requests			
Query firmware version number	Q	Ver X8 ↵	Show the controller firmware version.
Request part number	N	N60-340-01 ↵	Show the switcher's part #.
Request general info.	I	(See below.) Vid X1 • Aud X1 • Std X12 • Max X5 ↵	Show the switcher's status.
Request projector configuration	K	(16 char + spc + 16 char) ↵	Show which projector driver is being used. The response is a string of 16 characters + space + 16 characters (total = 33 characters).
Example:	K	Proxima_XXXXXXXX•YYYYYYYYYYYYYYYY ↵	
Zap (reset to default settings)			
Zap audio levels to 0dB	Esc zA	ZapA ↵	Reset all audio levels to 0dB.
Zap image adjustments/controls	Esc zI	ZapI ↵	Reset the image adjustments to factory settings.
Zap user learned IR drivers	Esc zU	ZapU ↵	Clear memory page 1 (remove learned IR drivers).
Zap Extron downloaded drivers	Esc zE	ZapE ↵	Clear memory page 0 (remove RS-232/IR projector drivers that were created by Extron and downloaded to the System 7 and remove user-entered RS-232 commands).
Zap all System 7 settings/memories	Esc zXXX	ZapXXX ↵	Reset everything: all settings, adjustments, and drivers to the factory default.

The syntax for setting a special function is __ * X? # where __ is the function number and X? is the value. To view a function's setting, use __#, where __ is the function number. In the following table the values of the X? variable are different for each command/function. These values are given in the rightmost column.

Command/response table for special function SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	X? values and additional descriptions
Delay times			
Power on delay	1 * X? #	WarmUp* X? ↵	0 = 0 seconds, 1 = 2 seconds, 2 = 4 seconds, ... in 2 second steps up to 150 = 300 seconds (5 minutes).
Example:	1*8#	WarmUp*08↵	*Example*: set a 16 second power on delay
Example:	1#	WarmUp*023↵	*Example*: view the power on delay setting.
Power off delay	2 * X? #	CoolDown* X? ↵	0 = 0 seconds, 1 = 2 seconds, 2 = 4 seconds,... in 2 second steps up to 150 = 300 seconds.
Example:	2*23#	CoolDown*023↵	*Example*: set a 46 second power off delay.
RGB delay (Triple-Action Switching)	3 * X? #	RGBDly* X? ↵	0 = 0.0 seconds (default), 1 = 0.5 seconds, 2 = 1.0 seconds, ... in ½ second steps up to 10 = 5.0 seconds
Example:	3*7#	RGBDly*07↵	*Example*: 3.5 second RGB delay
Room relays			
Room relay 1 mode/timing	4 * X? #	Rly1Tm* X? ↵	0 = toggle mode (press on/off), 1 = momentary, ⅛ second long, 2 = momentary, ¼ second long, 3 = momentary, ⅜ second long, ... in ⅛ second steps up to 16 = 2.0 seconds
Example:	4*15#	Rly1Tm*15↵	*Example*: momentary, 1.875 sec. long
Room relay 2 mode/timing	5 * X? #	Rly2Tm* X? ↵	0 = toggle mode (press on/off), 1 = momentary, ⅛ second long, 2 = momentary, ¼ second long, 3 = momentary, ⅜ second long, ... in ⅛ second steps up to 16 = 2.0 seconds
Example:	5*8#	Rly2Tm*08↵	*Example*: momentary, 1.0 sec. long
Scaler settings			
Scaler output sync format	6 * X? #	SyncOut* X? ↵	0 = RGBHV (default) 1 = RGBS 2 = RGsB (sync on green, SOG)
Example:	6*1#	SyncOut*1↵	*Example*: RGBHV sync output
Scaler output polarity	7 * X? #	SyncPol* X? ↵	0 = H-/V- (default) 1 = H-/V+ 2 = H+/V- 3 = H+/V+
Example:	7*1#	SyncPol*1↵	*Example*: H-/V+ sync polarity
Blue screen (blue & sync output only)	8* X? #	Blu* X? ↵	0 = off (default) (RGB & sync output) 1 = on (blue video & sync output only)
Example:	8*1#	Blu*1↵	*Example*: blue & sync output for setup

Command/response table for special function SIS commands (continued)

Command	ASCII Command (host to switcher)	Response (switcher to host)	X? values and additional descriptions
Audio settings			
Audio mute on/off w/display power	10 * X? #	AudMute* X? ↵	0 = no (audio doesn't mute when display power is off or unmute when display power is on) 1 = yes (default) (audio mutes when display power is off, audio unmutes when display power is on)
Example:	10*1#	AudMute*1↵	*Example*: set audio to mute when display powers off.
Limit audio level on power-up	11* X? #	VolLimit* X? ↵	0 = audio off, 1 = 1% of max. level, 2 = 2% of max possible level, ... up to 100. 50 = default value. 100 = no limit on audio level. If this feature is enabled, the maximum initial power-up volume level will not exceed the level specified by this command.
Example:	11*28#	VolLimit*028↵	*Example*: limit power-up volume to 28% of maximum volume.
IR-related settings			
Send IR/RS-232 commands associated with the currently selected input (reselect the current input channel) upon display power-up	12 * X? #	IR0m* X? ↵	0 = no (default) 1 = yes
Disable IR commands while the display's power is off	13 * X? #	IR1m* X? ↵	0 = no 1 = yes (default)
Repeat the display power-off command (after a slight delay). (For learned IR power-off commands only.)	14 * X? #	IR3m* X? ↵	0 = no (default) 1 = yes
Miscellaneous settings			
Autoselect input 7 signal type	9 * X? #	Sw7Auto* X? ↵	0 = no 1 = yes (default)
Automatic shut-off (issue a display power-off command after a specific period of inactivity)	15 * X? #	AutoOff* X? ↵	0 = disabled (use manual shutoff) (default), 1 = 15 minute shutoff delay, 2 = 30 minute delay, ... in 15 minute steps up to 32 = 480 minutes (8 hours).
Edge smoothing	16 * X? #	Fil* X? ↵	0 = no 1 = yes (default)

Command/response table for advanced instructions (for the Windows-based control program)

Data downloads/uploads are initiated by sending a series of hex commands to the host RS-232 port of the System 7 switcher. The Windows-based control program uses these commands mainly to load and save driver data and system configuration settings. See page 3-6 for information on projector control memory.

Command	Hex. command (host to switcher)	Response (switcher to host)	Additional description
Send/receive data to/from page 0 memory			
Send	80 A0 [16k bytes of data]	Dnl0 ↵	The host downloads 16k bytes of binary data to page 0 of the System 7's memory.
Recieve	80 A1		The System 7 sends 16k bytes of binary data to the host.
Send/receive data to/from page 1 memory			
Send	80 A2 [16k bytes of data]	Dnl1 ↵	The host downloads 16k bytes of binary data to page 1 of the System 7's memory.
Receive	80 A3		The System 7 sends 16k bytes of binary data to the host.
Send/receive a flag (parameter) block			
Send	80 A4 [32 bytes of data]	Prm0 ↵	The host sends 32 bytes of binary parameter data to the System 7.
Receive	80 A5		The System 7 sends 32 bytes of binary parameter data to the host.
Send/receive a segment (256 bytes) of data (a segment relating to a single button)			
Send	80 A6 ?? [256 bytes of data]	Seg0 ↵	The host sends 256 bytes of binary data to the System 7.
Receive	80 A7 ??		The System 7 sends 256 bytes of binary data to the host.
Send/receive 512 bytes of channel (button) data			
Send	80 A8 [512 bytes of data]	EEP0 ↵	The host sends 512 bytes of binary data to the System 7.
Receive	80 A9		The System 7 sends 512 bytes of binary data to the host.

NOTE *?? indicates the block number in hex notation where ?? can be 0 to 7F (hex) (0 to 127 decimal).*

NOTE *The responses shown are ASCII.*

Control Software for Windows

The included Extron SYSTEM 7SC Control Program for Windows offers another way to control the System 7 via RS-232 connection in addition to the Simple Instruction Set commands. The control program's graphical interface includes the same functions as those on the switcher's front panel and some additional features that are only available through the Windows-based software.

The control software must be used in order to download projector driver files into the System 7.

The control software is compatible with Windows 95/98, Windows NT, and Windows 2000. Extron's System 7SC Control Program is included with the System 7, and updates can be downloaded from the Extron Web site (http://www.extron.com).

Installing the software

The control program is contained on a set of 3.5-inch diskettes, and it requires approximately 2 MB (megabytes) of hard disk space.

To install the software on the hard drive:

1. Run SETUP.EXE from the floppy disk.
2. Follow the instructions that appear on the screen.

By default the installation creates a C:\System7 directory, and it places two icons (SYSTEM 7SC Control Pgm and SYSTEM 7SC Help) into a group or folder named "Extron Electronics".

Using the control program

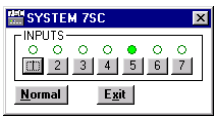
Many items found in the System 7SC Control Program are also accessible via front panel controls and the LCD menus described in chapters two and three. Refer to those chapters for details on features and settings. The SYSTEM 7SC Help Program provides information on settings and on how to use the control program itself. Some features, including the miscellaneous options, are only available via this control program. These features are described in the sections of this chapter that correspond to the parts of the control program where the features are found.

1. To run the control program, double-click on the SYSTEM 7SC Control Pgm icon in the Extron Electronics group or folder. The Comm menu appears on the screen.

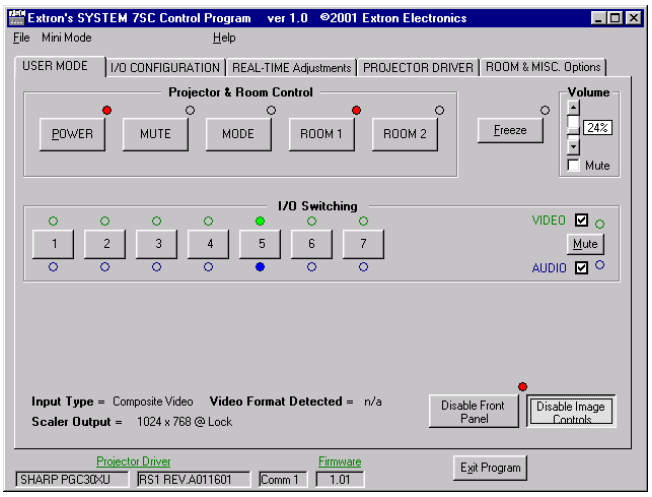
2. Click on the comm port that is connected to the System 7SC's RS-232 port. The Extron SYSTEM 7SC Control Program windows appear. The projector driver, port, and firmware information are displayed at the bottom of the screen. There are several views available: the *Mini Mode* screen, the *User Mode* screen, the *I/O Configuration* screen, the *Real Time Adjustments* screen, the *Projector Driver* screen, and the *Room & Misc. Options* screen.

Mini Mode

The *Mini Mode* screen, shown below, allows input selection only.



User Mode



The *User Mode* screen, shown here, includes the most frequently used controls: input selection, projector and room controls, variable output volume control, audio/video breakaway, freeze, and executive mode toggling.

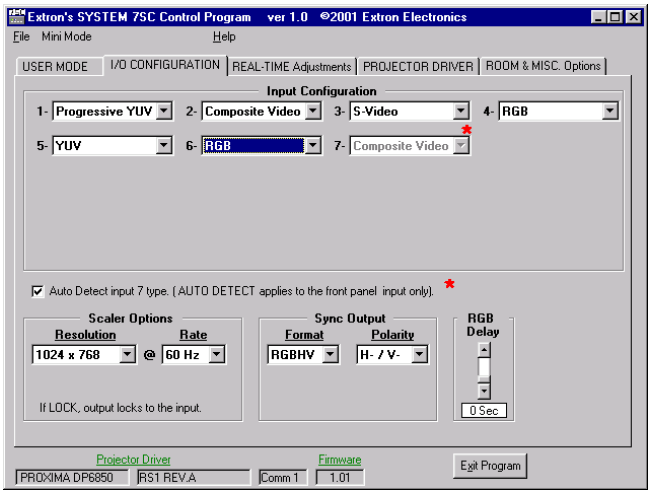
Special features

Freeze — Activating Freeze causes the output image to be still (frozen). This applies only to scaled outputs (non-RGB inputs).

Disable Front Panel — Enabling this feature locks the switcher's entire front panel so no changes can be made at the switcher or at the SCP control pads. Input selection and display/projector control can be performed from the IR 701 or via RS-232; adjustments can be done only through RS-232 control when Disable Front Panel is on.

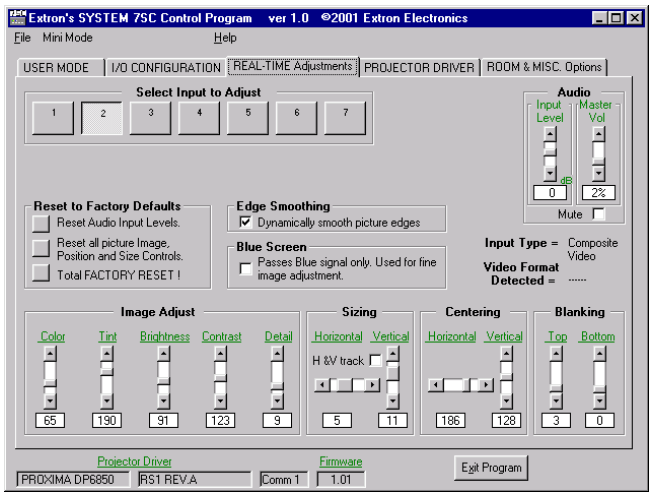
Disable Image Controls — This is feature is identical to Executive Mode, which is enabled by pressing the Color and Detail buttons at the same time. Disable Image Controls locks the picture adjustment and centering controls, but not the volume, input selection, and display controls.

I/O Configuration



The *I/O Configuration* screen, shown at left, allows you to select video input formats, scaler and sync output options, and RGB delay (Triple-Action switching delay time) settings. These settings are described in "Menus, Configuration, and Adjustments" in chapter three.

Real Time Adjustments



The *Real Time Adjustments* screen lets you adjust the picture settings and audio gain/attenuation for each input. From this menu you can also reset some or all of the settings to the original factory-installed settings.

Special features

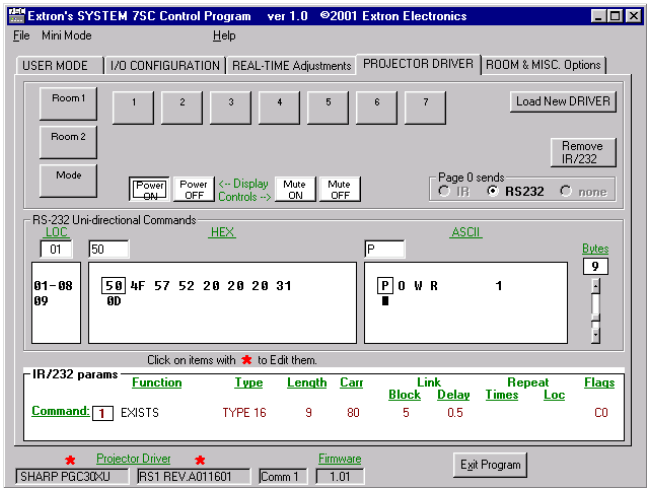
Reset to Factory Defaults — The reset features in the control program let you reset specific groups of functions.

- *Reset Audio Input Levels* sets all inputs' audio levels to 0.0dB.
- *Reset all picture Image, Position, and Size controls* sets all inputs' video adjustments (color, tint, contrast, brightness, detail, centering, sizing) to their factory default values.
- The *Reset to Default* feature available through the front panel LCD menus (see page 3-16) combines *Reset Audio Input Levels* and *Reset all picture Image, Position, and Size controls*. It resets all of the per-input adjustments for audio level, picture adjustments, and centering.

NOTE *None of the above reset options will reset the input formats, room relays, or IR/RS-232 drivers.*

- *Total Factory Reset!* is a global system reset that clears all settings including audio and video adjustments and IR and RS-232 commands and drivers. This is the same as the manual global reset. To reset the switcher manually press and hold the Menu and Next keys on the front panel while connecting the System 7 to an AC power source.

Projector Driver



The *Projector Driver* screen, shown below, displays the current IR and RS-232 parameters and commands. Commands and drivers can be loaded, entered (programmed), or edited from this screen. Using this screen, commands can be associated with each input selection, display/projector control, or room button.

Special features

All of the items found in this screen are only available in this part of the control program. There is no other way to perform these functions. After loading a projector driver, but before editing or programming RS-232 commands, click on the button (such as Room 1 or Power Off in the upper part of the Projector Driver screen) that you wish to edit or program. The System 7SC Help program provides step-by-step directions for programming buttons.

Load New Driver — Select this button to load a new, Extron-created projector driver file into the System 7SC and into the control program. Alternatively, you can select the Load New Driver From... option in the File menu.

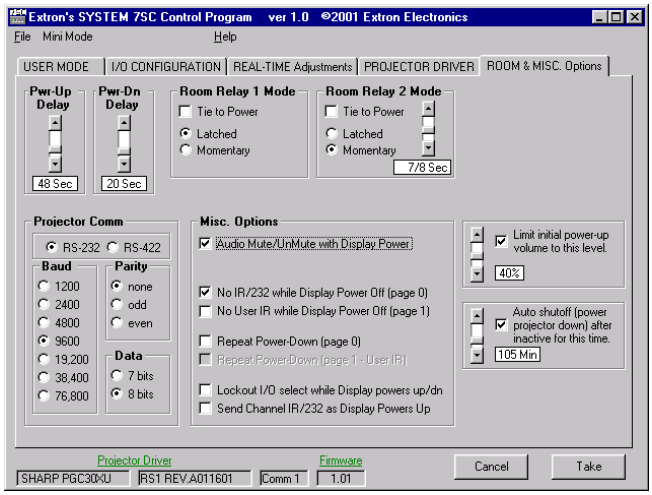
Remove IR/232 — Clicking on this option will erase the IR and RS-232 commands that are stored in the memory for the selected button.

Page 0 sends — This feature shows what type of commands (IR, RS-232, or none) the button is programmed to send. Choose RS-232 if you wish to program unidirectional RS-232 commands for the selected button.

RS-232 Uni-directional Commands — The location and hexadecimal and ASCII forms of any unidirectional RS-232 commands that have been programmed into the selected key will be displayed in this area. Commands and command length can also be entered or edited in this area. Refer to the System 7SC Help program for complete step-by-step programming directions.

IR/RS-232 params — This section shows parameter information about the command stored in memory for the selected button.

Room & Misc. Options



Use the *Room & Misc. Options* screen to set room relay modes and delay periods, power up/down delay periods, change projector communications settings, and perform other functions.

Special features

Tie (room relay) to Power — Enabling this feature for room relay 1 or room relay 2 will cause that relay to turn on/off when the Display Power is turned on or off.

Projector Comm — Set communications protocol (RS-232 vs. RS-422, baud rate, parity, data bits) in this section.

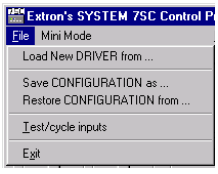
Misc. Options — This section provides a way to send (or not send) various commands, to mute audio, and to lock input selection when the Display Power is turned on or off. Descriptions of each item are available in the System 7SC Help file.

Limit initial power-up volume — Here you can specify an attenuation level for the initial volume of the audio output. If the Limit initial power-up volume box is not checked (enabled) or if the limit is set to 100%, the volume will not be limited (attenuated).

Auto shutoff — If Auto shutoff is enabled, the switcher monitors the time elapsed since the last input selection (or other function) and sends a display power off command (or that command and any other commands associated with the Display Power button) after a set period of inactivity. That period can be selected in fifteen-minute increments to be as long as 480 minutes (8 hours).

Saving and restoring configurations

The System 7SC can be configured by various means (IR learning, downloading, front panel adjustment, or combinations of those methods), and the configuration settings can be saved to a file for later use.



1. In the System 7SC Control Program, select File, then select Save Configuration as... .
2. Save the file as *(filename).sy7*. An unlimited number of configuration files can be saved as long as each file has a unique file name ending in *.sy7*.
3. To retrieve the configuration from within the System 7SC Control Program, select File, then select Restore Configuration from... . A set of all the switcher, scaler, picture, and audio adjustment settings, and also drivers will be downloaded into the System 7SC.

Using the help program

For information on program features, press the F1 computer key, or click on the Help menu from within the System 7SC control program, or double-click on the SYSTEM 7SC Help icon in the Extron Electronics group or folder.

For explanations of buttons or functions, click on the tabs in the help screen to reach the desired screen. Use a mouse or the Tab and Enter keys to select a button/function. A description and tips on using the program will appear on screen.

Downloading and using projector drivers

The System 7SC must be set up (configured) before it can control other equipment. Extron provides preset configurations in the form of projector driver files. Projector drivers assign projector IR commands to the System 7's front panel controls so that the display power, mute, and mode functions can be used to control the projector.

The most recent projector driver files are available at the Extron website at http://www.extron.com. To download files to computer, do the following:

1. From the Extron website, select Download, then select Projector Drivers.
2. In the Driver Information column in the list of projectors, select and click on the model of projector for which a driver is needed.
3. Follow the instructions that appear on screen.
4. If the projector driver has been successfully downloaded, the projector driver will be displayed in the Windows-based control program. It will also appear in the list of available projector drivers when Load New Driver From... is selected from the control program's File menu.

To view the settings and commands in each projector driver file without loading the driver into the System 7, run the System 7 control software in emulation mode.

1. On opening the control program select Emulate instead of one of the comm ports.
2. Select and double-click on the desired projector driver in the (drive):\System7\drivers folder. Projector driver filenames end in *.7SC*.

To load projector drivers into the System 7, do the following:

1. Upon opening the control program, select and double-click on a comm port.
2. Select the File pulldown menu.
3. Select Load New Driver from... and choose the appropriate driver.

Key to file names

File name	Description
_____RS1.7SC	Extron-supplied RS-232 unidirectional projector/display driver.
_____RS2.7SC	Extron-supplied RS-232 bidirectional projector/display driver.
_____IR.7SC	Extron-supplied IR unidirectional projector/display driver.
_____.sy7	User-saved System 7 configuration file. This includes adjustments/settings and whatever driver (if any) was installed in the System 7 at the time the file was saved.

A Appendix

Appendix

Specifications

Part Numbers and Accessories

Firmware Upgrade Installation

Glossary

Appendix

Specifications

Video

Gain	Unity
Bandwidth	350 MHz (-3dB)
Differential phase error	0.01°, 0 to 10 MHz
Differential gain error	0.01%, 0 to 10 MHz
Crosstalk	-50dB @ 5 MHz

Video input

Number/signal type	6 RGBHV/RGBS/RGsB/RsGsBs computer video, component video, S-video, or composite video
	1 RGBHV/RGBS/RGsB/RsGsBs computer video, S-video, or composite video
Connectors	6 x 5 BNC female ... RGB computer video, component video, S-video, or composite video
	1 15-pin HD female ... RGB computer video (input 7)
	1 4-pin mini-DIN female ... S-video (input 7)
	1 RCA female ... composite video (input 7)
Minimum/maximum levels	Analog ... 0.3V to 2V p-p with no offset
Impedance	75 ohms
Horizontal frequency	15 kHz to 150 kHz
Vertical frequency	30 Hz to 150 Hz
Return loss	-30dB @ 5 MHz
Maximum DC offset	1.5V

Video processing

Decoder	9 bit digital
Digital sampling	24 bit, 8 bits per color; 13.5 MHz (interlaced signals) 24 bit, 8 bits per color; 27 MHz (480p signals)
Colors	16.78 million

Video output

Number/signal type	2 RGBHV/RGBS/RGsB/RsGsBs* computer video (*RGsB, and RsGsBs will be output only if the input is RsGsBs.)
Connectors	1 x 5 BNC female 1 15-pin HD female
Minimum/maximum levels	0.3V to 2.0V p-p
Impedance	75 ohms
Scaled VGA resolution	640x480[1,3,4,5], 800x600[1,3,4,5], 832x624[3,4,5], 848x480[3], 852x480[3], 1024x768[1,3,4,5], 1280x768[2], 1280x1024[1,3,5], 1360x765[3], 1365x1024[3,5], 480p[3,5], 720p[3,5], 1080p[3,5], 1080i[3,5] [1] = at 50 Hz [2] = at 56 Hz [3] = at 60 Hz [4] = at 75 Hz [5] = locked to the current input's vertical refresh rate
Return loss	-30dB @ 5 MHz
DC offset	±5mV maximum with input at 0 offset
Switching type	Triple-Action™

Sync

Input type	RGBHV, RGBS, RGsB, RsGsBs
Output type	RGBHV, RGBS, RGsB, RsGsBs* (*RsGsBs will be output only if the input is RsGsBs.)
Standards	TTL (RGB) NTSC 3.58, NTSC 4.43, PAL and SECAM (S-video and composite video)

Input level	0.5V to 5V p-p
Output level	0.5V to 5V p-p
Input impedance	510 ohms
Output impedance	75 ohms
Max input voltage	5V p-p
Max. propagation delay	20 nS
Polarity	Positive or negative (follows input)

Audio

Gain	Unbalanced/balanced -15dB (min.) to +9dB (max.) adjustable per channel in 0.5dB increments
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	< 0.03% @ 1 kHz at rated maximum output drive
S/N	> 90dB at rated maximum output drive (+21dBu)
Crosstalk	< -80dB @ 1 kHz, fully loaded
Stereo channel separation	> 90dB @ 1 kHz
CMRR	> 75dB @ 20 Hz to 20 kHz

Audio input

Number/signal type	6 stereo, balanced/unbalanced (rear panel) 1 stereo, unbalanced (front panel)
Connectors	6 3.5 mm captive screw connectors, 5 pole, and 1 3.5 mm mini stereo jack (unbalanced), or 2 RCA female (white = L, red = R)
Impedance	>12.5 kohms balanced, 25 kohms unbalanced, DC coupled
Maximum level	+19.5dBu, (balanced or unbalanced) at stated %THD+N
Input gain adjustment	–15dB to +9dB, adjustable per input via RS-232 or front panel

Audio output

Number/signal type	2 line-level stereo, balanced/unbalanced
Connectors	2 3.5 mm captive screw connectors, 5 pole
Gain	+0dBu unbalanced, +6dBu balanced
Impedance	50 ohms unbalanced, 100 ohms balanced
Attenuation	
Fixed output	0%
Variable output	0% to 100%
Maximum level (Hi-Z)	> +21dBu, balanced or unbalanced at stated %THD+N
Maximum level (600 ohm)	> +15dBm, balanced or unbalanced at stated %THD+N

NOTE *0dBu = 0.775 volts (RMS).*

Control/remote — switcher

Serial control port	RS-232, 9-pin female D connector, dual port
Baud rate and protocol	9600, 8-bit, 1 stop bit, no parity
Serial control pin configurations	2 = TX, 3 = RX, 5 = GND
Contact closure	1 3.5 mm, 10-pole captive screw connector
Contact closure pin configurations	1 = input 1; 2 = input 2; 3 = input 3; ... ; 7 = input 7; 8, 9, 10 = GND
IR controller module	30 kHz to 60 kHz input frequency compatibility
Program control	Extron's control program for Windows Extron's Simple Instruction Set™ – SIS™

Control — room relay

Number/type	2 momentary or latching
Connectors	2 3.5 mm captive screw connectors, 5 pole
Contact rating	24V, 1 A

Control — projector

Projector control port	RS-232 ..... 1 3.5 mm captive screw connector, 10 pole IR ..... 1 3.5 mm captive screw connector, 5 pole

General

Power	100VAC to 240VAC, 50/60 Hz, 30 watts, internal, auto-switchable
Temperature/humidity	Storage -40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing Operating +32° to +104°F (0° to +40°C) / 10% to 90%, non-condensing
Rack mount	Yes, with included brackets
Enclosure type	Metal
Enclosure dimensions	3.5" H x 17" W x 9.5" D (2U high, 1 rack width) 8.9 cm H x 43.2 cm W x 24.1 cm D (Depth excludes connectors and knobs.)
Product weight	8.5 lbs (3.9 kg)
Shipping weight	18 lbs (8.2 kg)
Vibration	ISTA/NSTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Certifications	CE, FCC Class A
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *Specifications are subject to change without notice.*

Part Numbers and Accessories

Included parts

These items are included in each order for a System 7SC switcher:

Included parts	Part number
System 7SC (1)	60-340-01
Rubber feet (self-adhesive) (4)	
Rack mounting kit (brackets and screws) (1)	70-155-01
IR Emitter (1)	19-823-01
IR 701 remote control (1)	70-145-01
Batteries for the IR 701 remote control (2)	
9-pin male-to-male adapter (9-pin D GCM) (1)	26-128-01
3.5 mm, 5-pole captive screw connectors (11)	10-319-10
3.5 mm, 10-pole captive screw connectors (2)	10-319-11
UC 50′ (15 m) universal projector control cable	26-518-01
IEC power cord	
Tweeker (small screwdriver)	100-014-01
System 7SC User's Manual	68-499-01
System 7SC Windows-based control program	29-048-01

Accessories

These items can be ordered separately:

Accessories	Part number
IR Broadcaster	60-272-01
Current/display power sensor	60-271-01
SCP 200 (gray, black, white)	60-338-01, -02, -03
SCP 250 (gray, black, white)	60-356-01, -02, -03
SCP/AAP A (gray, black, white)	60-339-01, -02, -03
UC 100′ (30 m) universal projector control cable	26-518-02
UC 200′ (61 m) universal projector control cable	26-518-03

Firmware Upgrade Installation

In some cases the System 7SC's firmware may require replacement with an updated version. The user-replaceable firmware chip is U70, the main microcontroller. We recommend that you send the unit in to Extron for service and updates.

WARNING *Changes to firmware must be performed by authorized service personnel only. Some System 7SC firmware updates must be performed at the Extron factory.*

Follow these steps to replace firmware in the System 7SC.

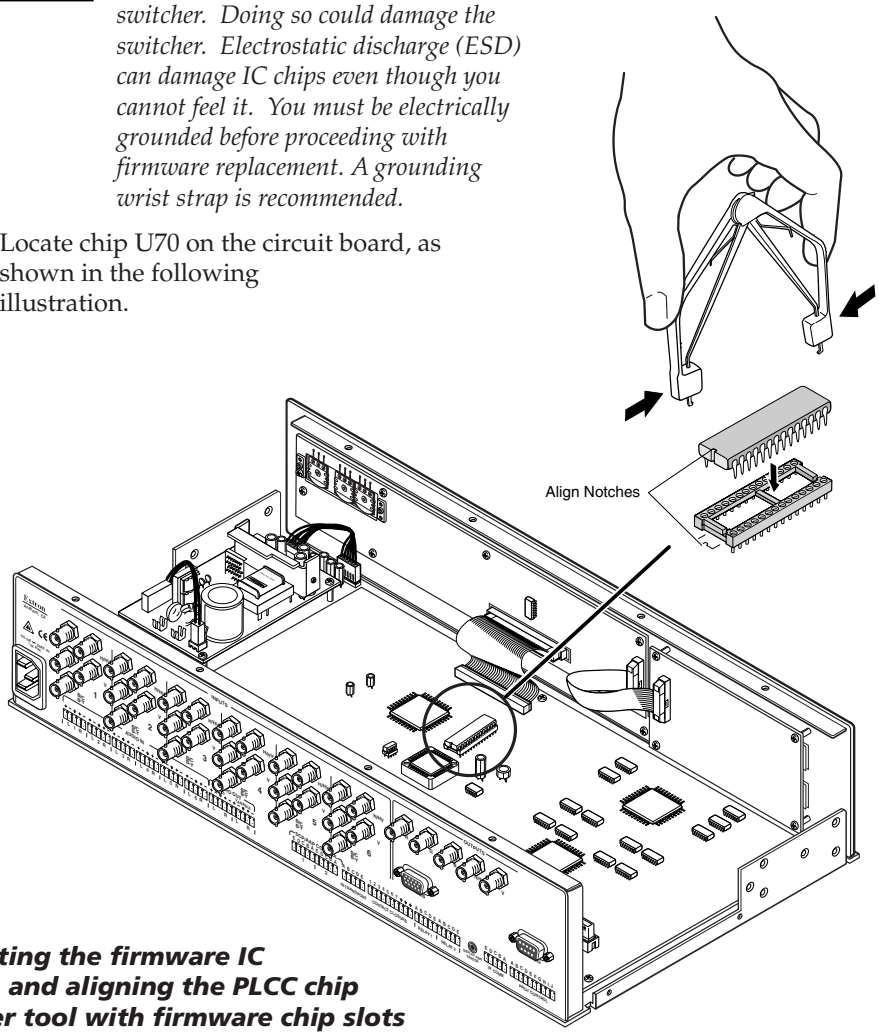
1. Disconnect the AC power cord from the System 7SC to remove power from the unit.

WARNING *To prevent electric shock, always unplug the System 7SC switcher from the AC power source before opening the enclosure.*

2. Remove the switcher from the rack, wall or furniture.
3. Remove the cover of the switcher (the top half of the enclosure) by removing the screws, then lifting the cover straight up. The fan is connected to the side of the cover. Do not disconnect the fan; set the cover down on the side that has the attached fan.

WARNING *Do not touch any switches or other electronic components inside the switcher. Doing so could damage the switcher. Electrostatic discharge (ESD) can damage IC chips even though you cannot feel it. You must be electrically grounded before proceeding with firmware replacement. A grounding wrist strap is recommended.*

4. Locate chip U70 on the circuit board, as shown in the following illustration.



Locating the firmware IC chip, and aligning the PLCC chip puller tool with firmware chip slots

5. After you are electrically grounded, align the hooks of a PLCC IC puller tool with the slots located in opposite ends of the firmware chip.
6. Insert the hooks into the slots, and squeeze the tool gently to grasp the chip.
7. Pull the chip straight out of the socket, and set it aside.
8. Align the slots of the new firmware IC chip with the angled corners of the socket in the same orientation as the old chip.
9. Gently but firmly press the chip into place in the socket.
10. Replace the top cover on the System 7SC switcher, and fasten it with the screws that were removed in step 3.
11. Rack mount the switcher, and reconnect the AC power cord.

Glossary

Attenuate/attenuation — To reduce the amplitude (strength) of a signal or current.

Balanced audio — A method that uses three conductors for one audio signal. They are plus (+), minus (-) and ground. The ground conductor is strictly for shielding, and does not carry any signal. Balanced audio is also called "differential audio".

Bandwidth — A frequency range, or "band" of frequencies between the limits defined by the "half power points", where the signal loss is -3dB. In audio and video, it is this band of frequencies that can pass through a device without significant loss or distortion. The wider the bandwidth, the better the quality that results, such as a sharper picture or better sound. The higher the bandwidth number the better the performance. (300 MHz is better than 250 MHz.) When a signal passes through a path with more than one device (including cables) the limiting factor (bottleneck) in that path is the device with the narrowest bandwidth.

Breakaway — The ability to separate audio and video signals for switching them independently. For example: the audio and video signals from one source may "break away" and be switched to two different destinations.

Buffer — Generally referred to as a unity gain amplifier, a buffer is used to isolate the signal source from the load. A buffer can be used for digital or analog signals.

IR learning — The ability of a device to receive and store infrared commands for other devices, such as a projector. Each command is assigned to a system operation (such as selecting an input). When an operation is executed, the associated (learned) command is then transmitted through an IR emitter or broadcaster to the projector, where it is executed.

IR library — Sets of downloadable infrared commands (drivers) for video projectors available at Extron's web site (www.extron.com).

Latching — The System 7SC room relay can operate in two modes: latching or momentary. In the latching mode, the relay remains active (latched) until it is manually reset (unlatched).

Level — The relative intensity (strength, voltage, volume) of an audio or video signal. The output level can be changed by attenuation (a decrease relative to the input signal) or gain (an increase in the signal level).

RGB delay — This is used in Triple-Action (video mute) Switching. With Triple-Action Switching, the System 7SC switches to the new sync signal before switching RGB (video) signals. That allows the projector to adjust to (lock onto) the new sync timing during a brief delay before displaying the new picture, which will appear without glitches.

3:2 pulldown — The process of matching the frame rate of film (24 frames per second) to the frame rate of video (30 frames per second for NTSC video). In 3:2 pulldown, one frame of film is converted to three fields (1½ frames) of video, and the next frame of film is converted to two fields (1 frame) of video. This process is repeated (yielding 3 fields of video, 2 fields, 3 fields, 2 fields,...) until the film is fully converted to a video of approximately the same length (duration). Most scan doublers, quadruplers, and scalers use the premise that two fields of video equal one frame, but video created via 3:2 pulldown does not follow that pattern.

FCC Class A Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805, USA

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Asia:

Extron Electronics, Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363

Japan:

Extron Electronics, Japan
Daisan DMJ Bldg. 6F,
3-9-1 Kudan Minami
Chiyoda-ku, Tokyo 102-0074
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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